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FINAL TECHNICAL MEMORANDUM FOR BUILDING 1100 NTC ORLANDO FL

5/23/1997

ABB ENVIRONMENTAL

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ABB

May 23, 1997

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Commanding Officer
SOUTHNAVFACENGCOM
2155 Eagle Drive
N. Charleston, S.C. 29419-9010

Attn: **Ms. Barbara Nwokike, Code 187300**

Subject: NTC, Orlando Operable Unit 4 (OU4)
Interim Remedial Action (IRA)
Final Technical Memorandum
Focused Investigation/Source Confirmation
Building 1100 Surge Tank
Contract; N62467-89-D-0317/CTO 107

Dear Barbara:

Enclosed for your use is the Final Technical Memorandum for the Building 1100 Surge Tank at OU4. This document provides results and conclusions based on our additional investigative activities at OU4.

Should you have any questions or need additional information, please call Mark Salvetti at (617) 245-6606 or me at (407) 895-8845.

Very Truly Yours,
ABB ENVIRONMENTAL SERVICES, INC.

John Kaiser

John P. Kaiser
Installation Manager
Enc.

JK/cp
cc: W. Hansel (SDIV)
M Maughon (SDIV)
J. Mitchell (FDEP)
N. Rodriguez (EPA)
Lt. G. Whipple (NTC, ORL)
M. Salvetti (ABB-ES)
B. Cohose (Bechtel)
S. McCoy (Brown & Root)

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TECHNICAL MEMORANDUM

INTERIM REMEDIAL ACTION
FOCUSED INVESTIGATION/SOURCE CONFIRMATION
BUILDING 1100 SURGE TANK
OPERABLE UNIT 4

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

UNIT IDENTIFICATION CODE: N65928
CONTRACT NO.: N62467-89-D-0317/107

MAY 1997

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010

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TECHNICAL MEMORANDUM

INTERIM REMEDIAL ACTION
FOCUSED INVESTIGATION/SOURCE CONFIRMATION
BUILDING 1100 SURGE TANK
OPERABLE UNIT 4

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Unit Identification Code: N65928

Contract No.: N62467-89-D-0317/107

Prepared by:

ABB Environmental Services, Inc.
2590 Executive Center Circle, East
Tallahassee, Florida 32301

Prepared for:

Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29418

Barbara Nwokike, Code 1873, Engineer-in-Charge

May 1997

CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, ABB Environmental Services, Inc. (ABB-ES), hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/107 are complete and accurate and comply with all requirements of this contract.

DATE: May 19, 1997

NAME AND TITLE OF CERTIFYING OFFICIAL: John P. Kaiser
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Mark J. Salvetti, P.E.
Project Technical Lead

(DFAR 252.227-7036)

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Orlando, Florida

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Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CLP	Contract Laboratory program
CRQL	contract required quantitation limit
DCE	dichloroethene
DELCD	dry electrolytic conductivity detector
DPT	direct push technology
ft/ft	feet per foot
FDEP	Florida Department of Environmental Protection
FFI	Focused Field Investigation
FFS	Focused Feasibility Study
FID	flame ionization detector
GC	gas chromatograph
HCl	hydrochloric acid
HNO_3	nitric acid
IDW	investigation-derived waste
IRA	Interim Remedial Action
MCL	maximum contaminant level
mℓ	milliliter
µg/ℓ	micrograms per liter
µg/kg	micrograms per kilogram
NAPL	nonaqueous-phase liquid
NEESA	Naval Energy and Environmental Support Activity
NTC	Naval Training Center
OD	outside diameter
OPT	Orlando Partnering Team
OU	Operable Unit
PCE	tetrachloroethene
PID	photoionization detector
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RI	Remedial Investigation
RI/FS	Remedial Investigation and Feasibility Study
RPD	relative percent difference
SCM	site conceptual model

GLOSSARY (Continued)

SOUTHNAV-FACENGCOM	Southern Division, Naval Facilities Engineering Command
SQL	sample quantitation limit
TAL	target analyte list
TCE	trichloroethene
USEPA	U.S. Environmental Protection Agency
VC	vinyl chloride
VOC	volatile organic compound

1.0 INTRODUCTION

ABB Environmental Services, Inc. (ABB-ES), under contract to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), has prepared this Technical Memorandum for the Interim Remedial Action (IRA) Focused Investigation/Source Confirmation, Building 1100 Surge Tank at Operable Unit (OU) 4, Former Dry-Cleaning and Laundry Facility, at the Naval Training Center (NTC), Area C, in Orlando, Florida. The Technical Memorandum has been prepared under contract number N62467-89-D-0317/107. This report presents the field methodology and results of the source confirmation investigation for the Building 1100 surge tank at OU 4.

1.1 **OVERVIEW OF THE OU 4 IRA**. Implementation of the IRA was directed by the Orlando Partnering Team (OPT) to evaluate the area between Building 1100 and Lake Druid and if necessary provide an interim solution to protect the lake. A brief overview of OU 4 and the IRA characterization is presented below to provide project background information. Additional information can be referenced in the *Interim Remedial Action, Focused Field Investigation Report, Operable Unit 4* (ABB-ES, 1996a), *Operable Unit 4 IRA Treatability Study, Pumping Test Implementation and Results* (ABB-ES, 1996b) and the *Focused Feasibility Study, Operable Unit 4* (ABB-ES, 1997).

Building 1100, the former dry-cleaning and laundry facility, is located in the northwest corner of Area C. It was constructed in 1943 and has been traditionally used as an industrial laundry and dry-cleaning facility, serving the entire base until it closed in 1994. Prior to construction in 1943 the area was undeveloped.

Groundwater, surface water, and sediment samples collected during site screening and IRA activities between Building 1100 and Lake Druid indicated the presence of volatile organic compounds (VOCs) within the surficial aquifer and in Lake Druid. Primary VOC contaminants include chlorinated solvents such as tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-DCE) and vinyl chloride (VC). VOC concentrations in Lake Druid exceeded Florida Department of Environmental Protection (FDEP) Surface Water Standards.

The objective of the IRA Focused Field Investigation (FFI) was to identify the source of VOCs in Lake Druid. The FFI concluded that VOC-contaminated groundwater migrated west into Lake Druid from a potential source area near the northwest corner of Building 1100 (in line with the surge tank), as shown on Figure 1-1.

A Focused Feasibility Study (FFS) was performed to evaluate the best alternative for mitigating the VOCs in Lake Druid. The FFS recommended recirculating/in-well stripping technology as the preferred alternative for the IRA. This alternative will be designed to gain control over the migration pathways of VOC concentrations that contribute to the exceedences of Florida Surface Water Standards in Lake Druid.

1.2 **OBJECTIVE OF THE FOCUSED INVESTIGATION/SOURCE CONFIRMATION**. The surge tank was identified as a potential release point for PCE from the dry-cleaning

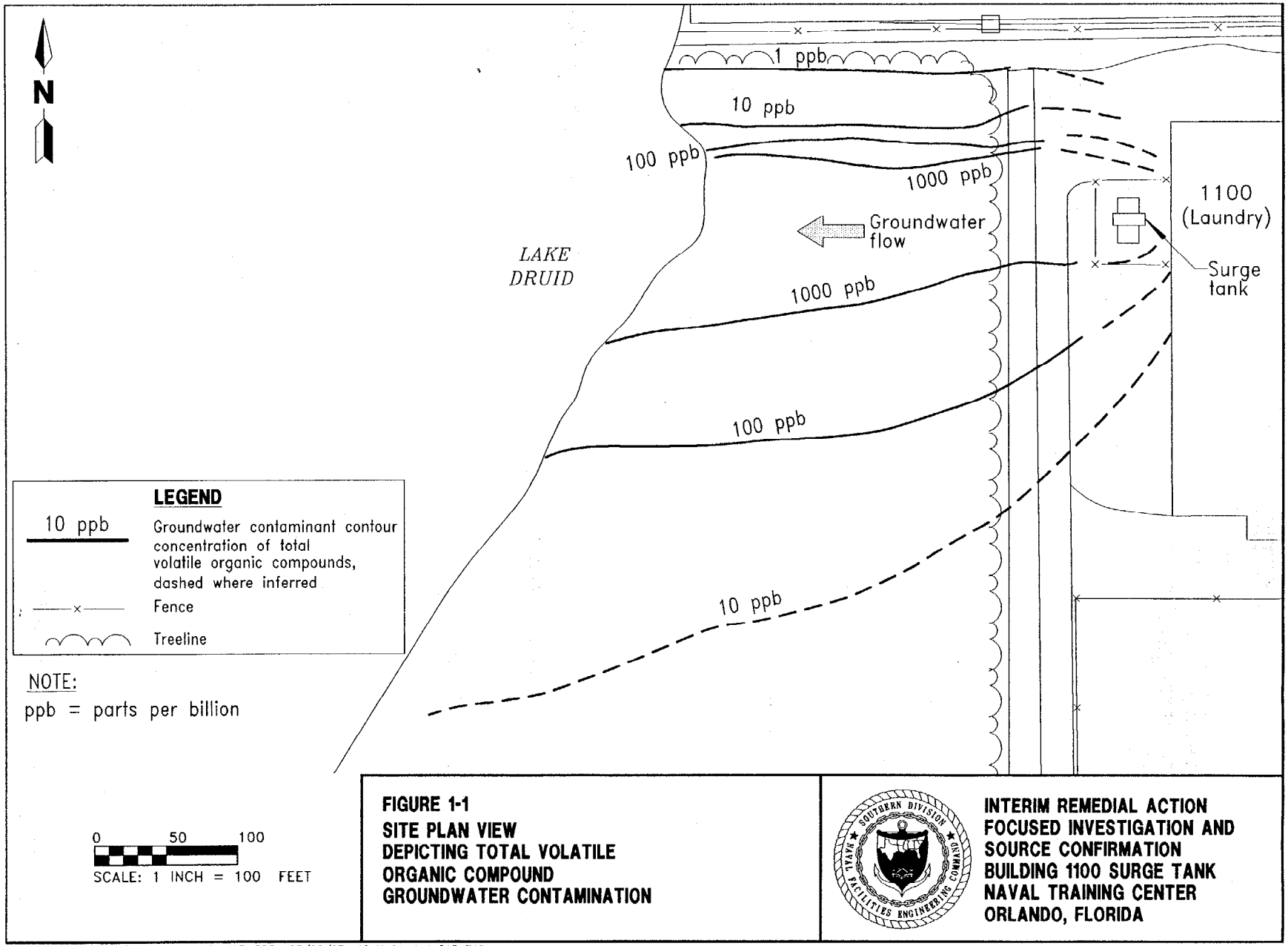

FIGURE 1-1
SITE PLAN VIEW
DEPICTING TOTAL VOLATILE
ORGANIC COMPOUND
GROUNDWATER CONTAMINATION

INTERIM REMEDIAL ACTION
FOCUSED INVESTIGATION AND
SOURCE CONFIRMATION
BUILDING 1100 SURGE TANK
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

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process. All wastewater from the laundry was directed via floor drains to the surge tank prior to discharge to the sanitary sewer. Releases of PCE or PCE-contaminated wastewater could have reached the surge tank through the floor drains, and then were released to the environment through hydrostatic relief valves in the bottom of the tank.

The overall objective of the focused investigation is the confirmation assessment of the subsurface area around the surge tank as a primary source of groundwater VOC contamination. If confirmed as a source, an additional recirculation well(s) would be considered to aggressively attack the source area, therefore expediting the site cleanup process.

1.3 PURPOSE OF THE TECHNICAL MEMORANDUM. This technical memorandum presents and evaluates the data collected during the investigation and makes recommendation(s) based on achieving the overall objective. The evaluations and interpretations presented in this technical memorandum are based on the data collected for this effort along with the previously collected IRA field data. The memorandum is not intended to be conclusive with respect to characterizing all sources for groundwater contamination at OU 4, but rather to confirm the surge tank area as a primary source for groundwater VOC contamination. Additional source characterization is expected during the OU 4 Remedial Investigation (RI).

1.4 SITE CONCEPTUAL MODEL. The site conceptual model (SCM) for OU 4 has been continually refined based on results from each of the preceding field investigations. As intended for the IRA, the FFI results were sufficient to determine that contaminated groundwater was the source of VOCs in Lake Druid (ABB-ES, 1996c).

As directed by the Navy and the OPT, the FFI did not focus heavily on identifying areas, but rather the potential release pathways to Lake Druid. This focused investigation initiates source characterization activities, which will be continued through the Remedial Investigation and Feasibility Study (RI/FS).

The revised SCM, up until this focused investigation, is shown as Figure 1-2. Refinement of the SCM will continue as a result of the additional data collected for this investigation and for all future investigations through the site closure for OU 4.

1.5 OVERVIEW OF THE TECHNICAL MEMORANDUM. The remainder of this technical memorandum presents the methodology of the field and analytical programs; the results from these programs; and based on the results, the conclusions and recommendations regarding meeting the objective of the focused investigation.

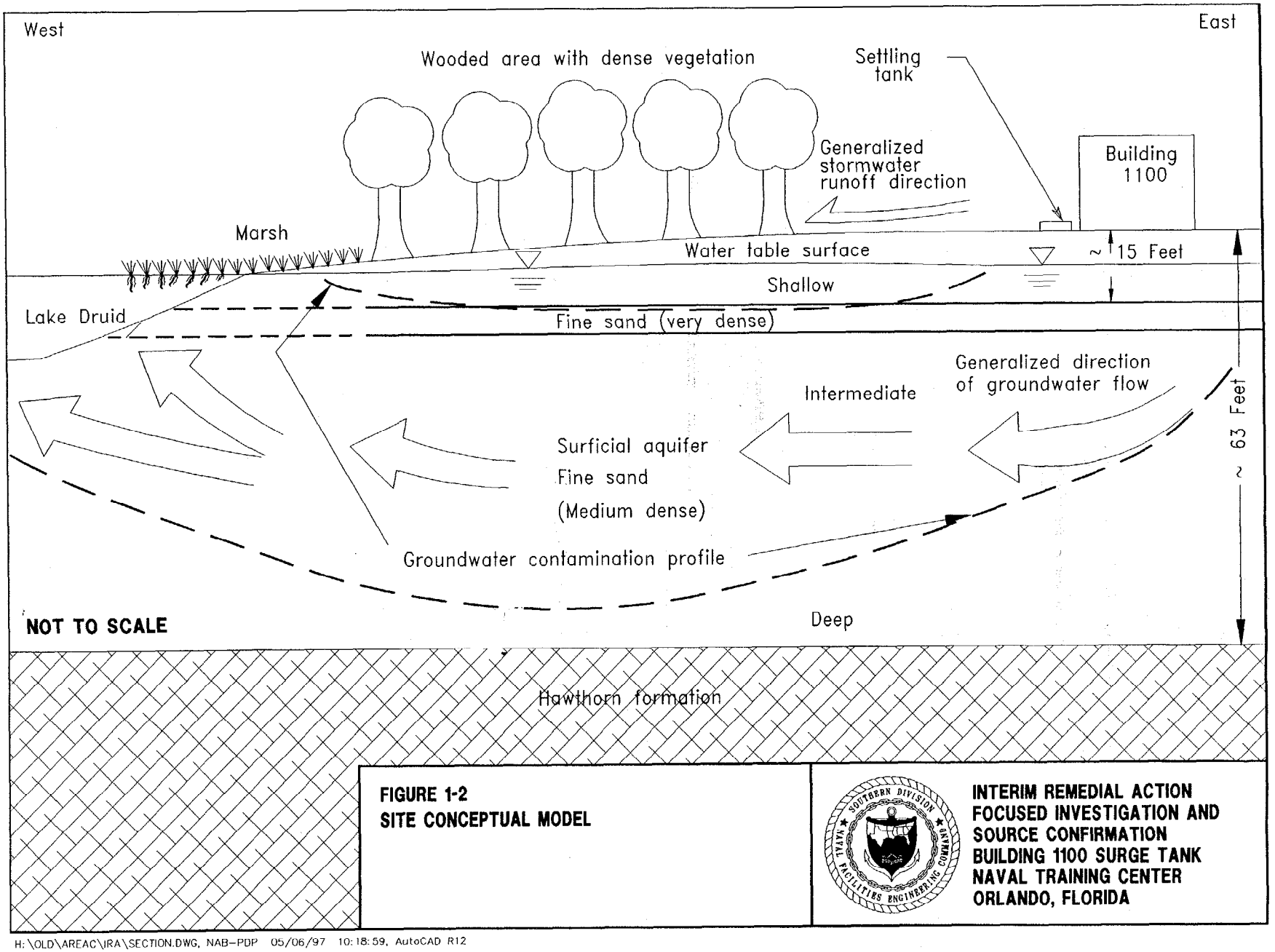

FIGURE 1-2
SITE CONCEPTUAL MODEL

INTERIM REMEDIAL ACTION
FOCUSED INVESTIGATION AND SOURCE CONFIRMATION
BUILDING 1100 SURGE TANK
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

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2.0 FIELD PROGRAM

Previous TerraProbe℠ groundwater sampling just downgradient of the surge tank detected high concentrations of chlorinated solvents (ABB-ES, 1996c). Chlorinated solvents were also detected in shallow monitoring wells installed north and east of Building 1100 during the site screening program (ABB-ES, 1996c), at concentrations much lower than were detected near the surge tank. However, this sampling effort was fairly limited.

The focused investigation/source confirmation concentrated on the area upgradient of the surge tank, primarily under the laundry itself. This was the most likely location for additional sources associated with the storage and use of PCE in the dry-cleaning process. If VOC concentrations in soil and groundwater under the laundry were comparable to the concentrations immediately downgradient of the surge tank, then other source(s) besides the surge tank were likely contributing to the plume. However, if VOC concentration under the laundry were much less than nearer the surge tank, then the surge tank would likely be the primary source of VOCs.

The focused investigation/source confirmation field effort included the use of the TerraProbe℠ to collect groundwater and subsurface soil samples and to install MicroWells. A field laboratory, with confirmation data analysis coming from an off-site laboratory, was set up onsite to provide real-time analytical data. The effort also included resampling of the existing monitoring wells around Building 1100 and evaluation of water levels to reestablish groundwater flow directions around the OU 4 area.

2.1 TERRAPROBE℠. The TerraProbe℠ was used to collect subsurface soil and groundwater samples from beneath the floor and around Building 1100 and the surge tank (Figure 2-1). Additionally, the TerraProbe℠ was used to install three MicroWells to provide permanent groundwater sampling points beneath the floor of Building 1100 (Figure 2-2).

All sampling locations beneath the floor of Building 1100 required sections of the concrete floor to be removed before samples were collected. A coring drill with a 6-inch-diameter core bit was used to remove the concrete. The thickness of the concrete floor ranged from 5 inches to 8 inches, with no reenforcement material being encountered, such as rebar or wire mesh. The foundation material beneath the concrete floor was compacted fine sand.

2.1.1 Subsurface Soil Sampling The TerraProbe℠ system utilized two different tools to collect subsurface soil samples. The first soil sampler consisted of a 4-foot-long, 2-inch-diameter stainless steel tube, with a polyethylene terephthalate sleeve and a retractable piston point. This assembly was advanced with a series of rods using hydraulic pressure along with percussion hammering to the desired depth. The piston point was released at the required sampling depth, and the sampler was advanced to depth collecting the soil in the polyethylene terephthalate sleeve. This method of collection was generally only utilized above the water table, because the retractable piston point proved unreliable below the water table.

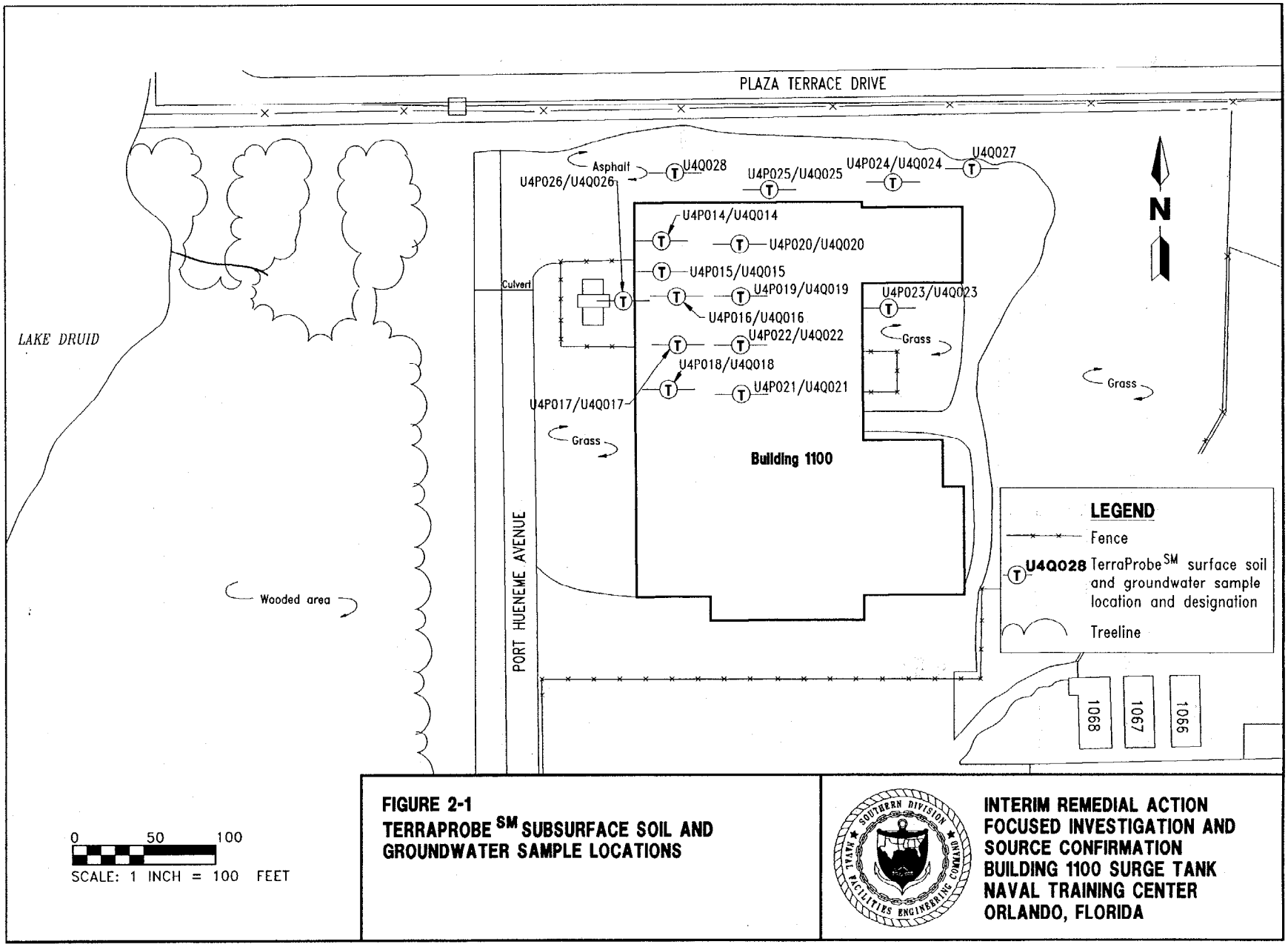

FIGURE 2-1
TERRAPROBE SM SUBSURFACE SOIL AND GROUNDWATER SAMPLE LOCATIONS

INTERIM REMEDIAL ACTION FOCUSED INVESTIGATION AND SOURCE CONFIRMATION BUILDING 1100 SURGE TANK NAVAL TRAINING CENTER ORLANDO, FLORIDA

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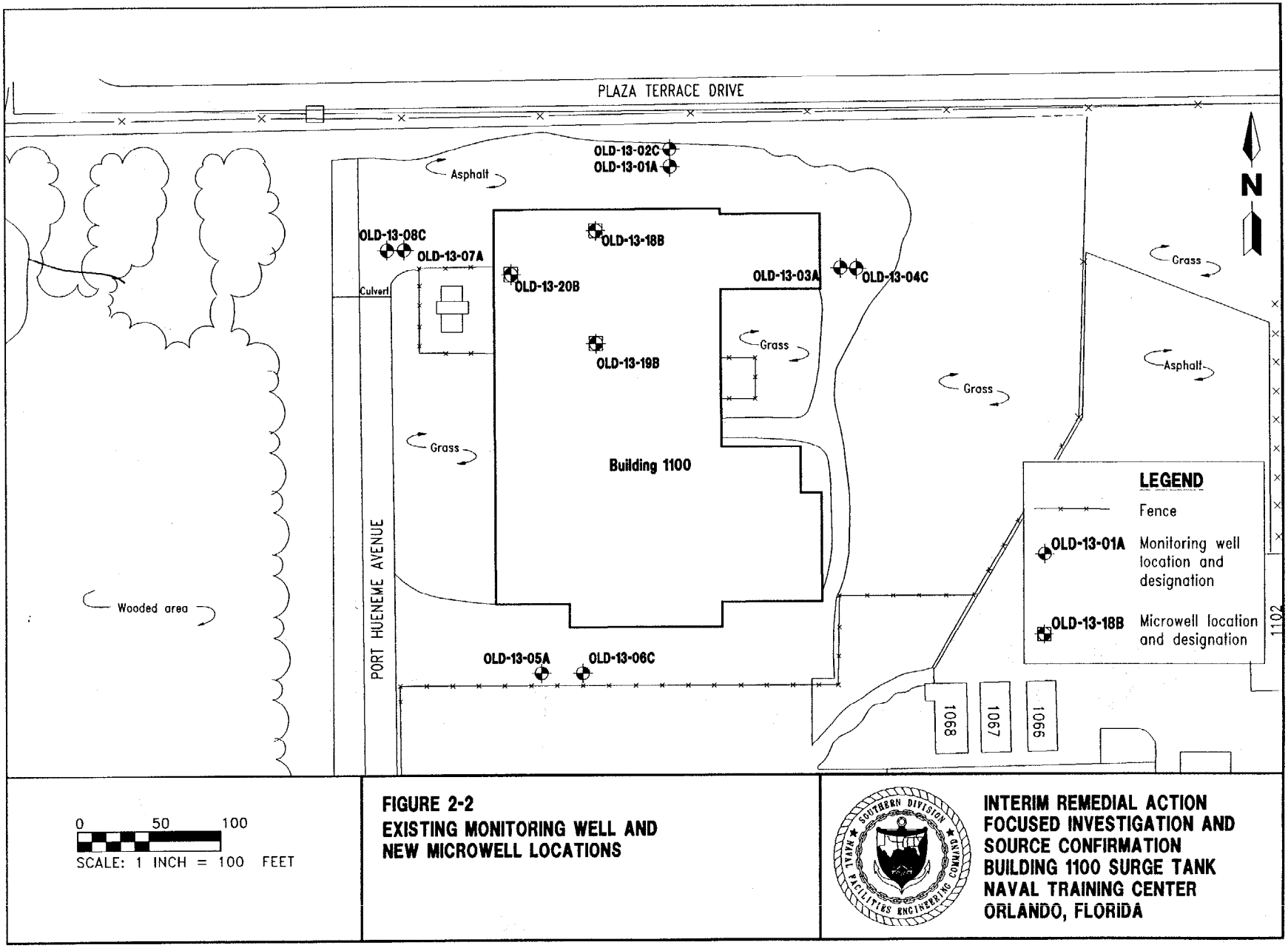

FIGURE 2-2
EXISTING MONITORING WELL AND NEW MICROWELL LOCATIONS

INTERIM REMEDIAL ACTION FOCUSED INVESTIGATION AND SOURCE CONFIRMATION BUILDING 1100 SURGE TANK NAVAL TRAINING CENTER ORLANDO, FLORIDA

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The alternative soil sampler was a 2-foot-long, 1.25-inch-diameter polyethylene terephthalate sleeved stainless steel tube, with a piston rod and point assembly. This soil sampler was advanced in the same manner as the previous sampler. Because of the smaller diameter of this sampler, soil sample recovery below the water table was more successful.

Upon collecting the subsurface soil sample, the soil was extracted from the polyethylene tube and field analyzed with a flame ionization detector (FID). Samples that registered greater than 1,000 parts per million (ppm) on the FID were intended for screening using a hydrophobic dye test prior to laboratory analysis. Sudan IV, a red dye that is insoluble in water but soluble in most organic liquids, would be mixed with the soil sample and a measured amount of organic-free water and shaken vigorously. If a red color appeared in the vial, then nonaqueous-phase liquid (NAPL) was present, providing a rapid and simple means of identifying residual contamination in the field.

From March 10, 1997, to March 16, 1997, 69 soil samples were collected from 12 locations (U4P014 to U4P021 and U4P023 to U4P026) at OU 4, beneath the floor and around Building 1100, as shown on Figure 2-1. Soil samples were collected from depths, based on refusal, ranging from 0 to 28 feet below land surface (bls). At each location, soil samples were collected at frequent intervals to provide detailed vertical delineation. In general, soil samples were collected every 4 feet to a depth of approximately 28 feet bls or to refusal. Sampling depths varied based on hardships encountered during penetration and recovery, such as poor or no recovery, failure to deploy soil sampler, and refusal. Table 2-1 lists all TerraProbe℠ soil sample intervals.

Of the 69 subsurface soil samples collected via TerraProbe℠, 60 were analyzed in the onsite laboratory for target VOCs. Seven of these 60 samples were also submitted to an off-site laboratory for confirmatory analysis. The nine remaining soil samples collected at locations U4P019 and U4P021 were sent exclusively to the offsite laboratory, to allow the onsite laboratory time to catch up and continue to provide real-time data. Off-site samples were analyzed for VOCs using SW 846 U.S. Environmental Protection Agency (USEPA) Method 8240B. Chapter 3.0 provides more detailed information about the analytical program for this investigation. The results of this sampling effort are discussed in Chapter 4.0 of this technical memorandum.

2.1.2 Groundwater Sampling The TerraProbe℠ groundwater sampling system consisted of a telescoping assembly containing a 2-foot-long retractable stainless steel well screen fitted with an expendable tip. This assembly was advanced using hydraulic pressure along with percussion hammering to force a series of rods to the desired depth. The screen was exposed to groundwater by retracting the outer casing of the sample device, allowing natural hydrostatic pressure to force groundwater into the sampler. Teflon™ tubing was then lowered down into the screened interval, and groundwater was purged using a peristaltic pump. After connection with the surrounding formation was established through pumping and the groundwater appeared clear, the Teflon™ tubing was crimped and pulled to the surface. The groundwater sample was collected by gravity flow out of the tubing and into the sample containers. Samples were collected for analysis at both onsite and off-site laboratories.

From March 10, 1997, to March 16, 1997, groundwater samples were collected from 14 locations (U4Q014 to U4Q021 and U4Q023 to U4Q028) at OU 4, beneath the

Table 2-1
TerraProbe℠ Soil Sample Intervals

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Location	Sample ID	Depth (feet)	Location	Sample ID	Depth (feet)	Location	Sample ID	Depth (feet)
U4P014	U4P01401	0-4		U4P01706	20-24		U4P02303	8-12
	U4P01402	4-8		U4P01707	26-28		U4P02304	14-16
	U4P01403	10-12	**U4P018**	U4P01801	0-4		U4P02305	18-20
	U4P01404	14-16		U4P01802	4-8		U4P02306	22-24
	U4P01405	18-20		U4P01803	8-12	**U4P024**	U4P02401	0-4
	U4P01406	21-23	**U4P019**	U4P01901	0-4		U4P02402	4-8
U4P015	U4P01501	0-4		U4P01902	4-8		U4P02403	8-12
	U4P01502	4-8		U4P01903	8-12		U4P02404	14-16
	U4P01503	8-12		U4P01904	14-16		U4P02405	18-20
	U4P01504	14-16		U4P01905	18-19		U4P02406	22-24
	U4P01505	18-20	**U4P020**	U4P02001	0-4		U4P02407	26-28
U4P016	U4P01601	0-4		U4P02002	4-8	**U4P025**	U4P02501	0-4
	U4P01602	4-8		U4P02003	8-12		U4P02502	4-8
	U4P01603	8-12		U4P02004	14-16		U4P02503	8-12
	U4P01604	12-16		U4P02005	18-20		U4P02504	14-16
	U4P01605	16-20		U4P02006	22-24		U4P02505	18-20
	U4P01606	20-24		U4P02007	26-28		U4P02506	22-24
	U4P01607	24-28	**U4P021**	U4P02101	0-4		U4P02507	26-28
U4P017	U4P01701	0-4		U4P02102	4-8	**U4P026**	U4P02601	0-4
	U4P01702	4-8		U4P02103	8-12		U4P02602	4-8
	U4P01703	8-12		U4P02104	15-17		U4P02603	8-12
	U4P01704	12-16	**U4P023**	U4P02301	0-4		U4P02604	22-24
	U4P01705	16-20		U4P02302	4-8		U4P02605	26-28

Note: ID = identification.

floor and around Building 1100, as shown on Figure 2-1. Fifty-four groundwater samples were collected from depths ranging from 11 to 32 feet bls.

At each location, groundwater samples were collected at frequent intervals to provide detailed vertical delineation. In general, water samples were collected every 4 feet to a depth of approximately 30 feet bls or to refusal. Actual sampling depths varied based on difficulties encountered, such as poor or no recovery of groundwater, failure to deploy screen completely, and refusal. Table 2-2 lists all TerraProbe℠ groundwater sample intervals.

Of the 54 groundwater samples collected, 52 were analyzed in the onsite laboratory for target VOCs. Eight of the 52 samples were submitted to an off-site laboratory for confirmatory analysis. The remaining two groundwater samples from U4Q019 were sent exclusively to the off-site laboratory, to allow time for the onsite laboratory to catch up and continue to provide real-time data. Off-site samples were analyzed for VOCs using the USEPA Method 524.2 for volatile organics. Chapter 3.0 provides more detailed information about the analytical program for this investigation. The results of this sampling effort are discussed in Chapter 4.0 of this technical memorandum.

2.1.3 MicroWell Installation On March 14, 1997, three MicroWells were installed through the floor inside Building 1100 at OU 4 to provide permanent monitoring locations for the surficial aquifer beneath the building. These MicroWells enable groundwater to be sampled via peristaltic pump and Teflon™ tubing, similar to a conventional monitoring well. The TerraProbe℠ was used to install these MicroWells (OLD-13-18B to OLD-13-20B as shown on Figure 2-2). All MicroWells were constructed of 0.5-inch-diameter, polyvinyl chloride (PVC) prepacked screen and riser. These Microwells were constructed with 6 feet of 0.010-inch slotted screen prepacked with 20/40 silica sand. The MicroWells were installed through a 2-inch-diameter stainless steel casing fitted with an expendable point that was advanced using hydraulic pressure along with percussion hammering. After the desired depth was reached with the 2-inch-diameter casing, the prepacked screen(s) was lowered down the inside of the casing along with the required length of riser. The casing was then retracted as additional filter material was added, leaving behind the MicroWell. The MicroWell was then completed in the same manner as a typical monitoring well as shown on Figure 2-3. MicroWell construction diagrams are included in Attachment A.

The location of two of the MicroWells coincides with TerraProbe℠ subsurface soil and groundwater sampling locations. OLD-13-18B was installed to a depth of 31.5 feet bls at location U4Q020/U4P020. OLD-13-20B was installed to a depth of 20.0 feet bls at location U4Q015/U4P015. OLD-13-19B was installed to a depth of 20.5 feet bls at U4Q022; no subsurface soil or groundwater samples were collected from this location with the TerraProbe℠. Additional MicroWell details are included in Table 2-3.

2.2 GROUNDWATER SAMPLING. The groundwater samples were collected from three new Microwells and eight monitoring wells originally installed during the initial site screening effort. The locations of the monitoring wells and MicroWells are shown on Figure 2-2.

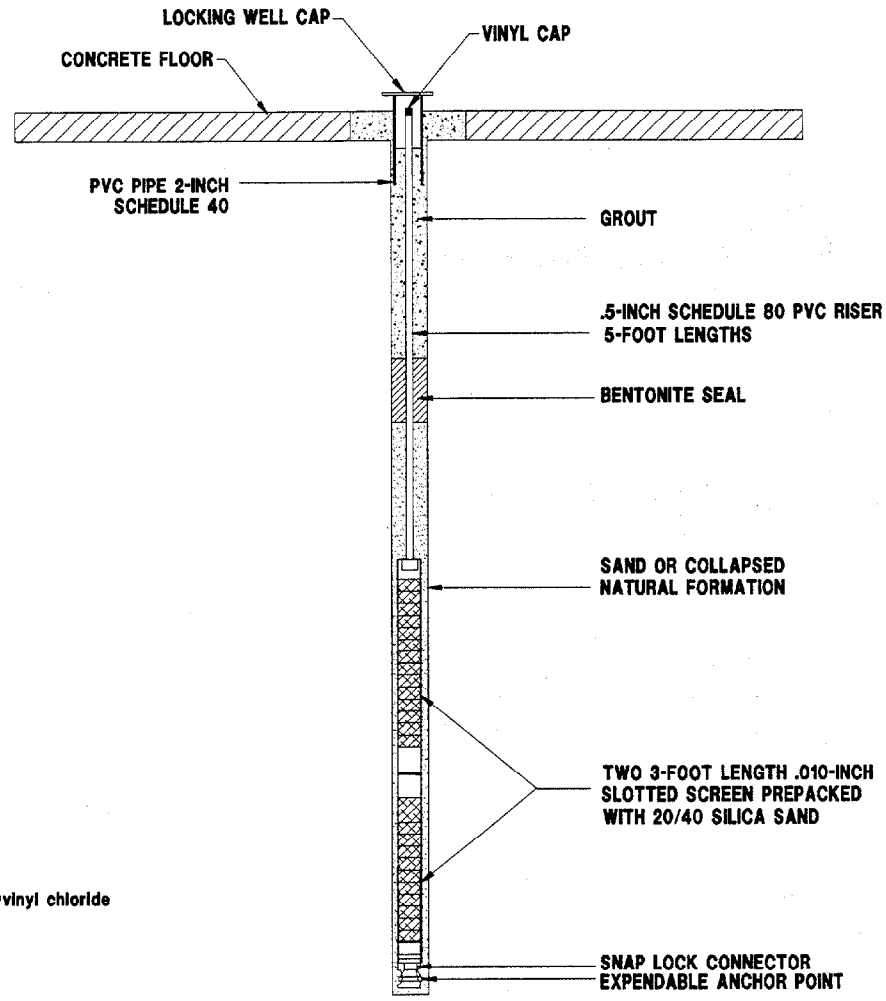
The wells were sampled from March 24, 1997, to March 25, 1997. Prior to sampling, each well was purged, to obtain groundwater samples representative of

Table 2-2
TerraProbe℠ Groundwater Sample Intervals

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Location	Sample ID	Depth (feet)	Location	Sample ID	Depth (feet)	Location	Sample ID	Depth (feet)
U4Q014	U4Q01401	11-13	**U4Q019**	U4Q01901	12-14		U4Q02502	16-18
	U4Q01402	16-18		U4Q01902	16-18		U4Q02503	20-22
	U4Q01403	20-22	**U4Q020**	U4Q02001	12-14		U4Q02504	24-26
	U4Q01404	24-26		U4Q02002	16-18		U4Q02505	28-30
U4Q015	U4Q01501	12-14		U4Q02003	20-22	**U4Q026**	U4Q02601	12-14
	U4Q01502	16-18		U4Q02004	24-26		U4Q02602	16-18
	U4Q01503	20-22		U4Q02005	28-30		U4Q02603	20-22
U4Q016	U4Q01601	12-14	**U4Q021**	U4Q02101	13-15		U4Q02604	24-26
	U4Q01602	16-18		U4Q02102	16-18		U4Q02605	28-30
	U4Q01603	20-22	**U4Q023**	U4Q02301	12-14	**U4Q027**	U4Q02701	12-14
	U4Q01604	24-26		U4Q02302	16-18		U4Q02702	16-18
	U4Q01605	28-30		U4Q02303	20-22		U4Q02703	20-22
U4Q017	U4Q01701	12-14	**U4Q024**	U4Q02401	12-14		U4Q02704	24-26
	U4Q01702	16-18		U4Q02402	16-18		U4Q02705	28-30
	U4Q01703	20-22		U4Q02403	20-22	**U4Q028**	U4Q02801	12-14
	U4Q01704	24-26		U4Q02404	24-26		U4Q02802	18-20
	U4Q01705	28-30		U4Q02405	28-30		U4Q02803	24-26
U4Q018	U4Q01801	12-14	**U4Q025**	U4Q02501	12-14		U4Q02804	30-32

Note: ID = identification.



NOTE:
PVC = Polyvinyl chloride

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FIGURE 2-3
TYPICAL MICROWELL

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INTERIM REMEDIAL ACTION
FOCUSED INVESTIGATION AND
SOURCE CONFIRMATION
BUILDING 1100 SURGE TANK
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Table 2-3
MicroWell Designation

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Well ID	Corresponding TerraProbe℠ Location	Depth Of Screened Interval (feet bls)	Sample Designation
OLD-13-18B	U4Q020/U4P020	25.5-31.5	U4G01801
OLD-13-19B	U4Q022/U4P022	14.5-20.5	U4G01901
OLD-13-20B	U4Q015/U4P015	14-20	U4G02001

Notes: ID = identification.
bls = below land surface.

aquifer conditions, using low-flow techniques to clear the well of stagnant water. The purpose of using low-flow purging was to ensure that the groundwater sample taken was from the targeted aquifer zone (Table 2-4). Dedicated 1/4-inch outside diameter (OD) Teflon™ tubing was inserted into each well and connected to an ISCO™ peristaltic pump for purging. All investigation-derived waste (IDW) generated from well purging was placed in labeled drums at a staging area north of Building 1100.

During purging, temperature, pH, conductivity, and turbidity were measured regularly with an Orion Model 250A (temperature, pH), YSI Model 33 (conductivity) and a LaMotte Model 2008 (turbidity meter), respectively. When the parameters had stabilized, the sample was collected. The eight monitoring wells were sampled for VOCs using USEPA Method 524.2 and Contract Laboratory program (CLP) target analyte list (TAL) metals. Samples from the three MicroWells were analyzed only for VOCs. Refer to the Groundwater Sample Field Data forms in Appendix B for more specific details of each purge and sample taken.

The groundwater samples for TAL metals were collected using a vacuum purge method of low-flow sampling. The method utilized a new 2.5-liter amber bottle and a #5 size rubber stopper, wrapped in a Teflon™ swatch. The stopper was placed in the bottle mouth with two 1/4-inch OD Teflon™ tubing sections inserted through two holes in the stopper. One piece of tubing ran up from the well and into the bottle, and the other ran from the bottle to the peristaltic pump. The inlet of the tubing in the well was set at the midpoint of the screened interval. A vacuum was created in the bottle, and the groundwater sample was slowly drawn in. The 2.5-liter amber bottle was filled, and the contents were poured into a 1-liter high density polyethylene container and preserved with nitric acid (HNO_3).

Groundwater for VOC analysis was collected last in two 40-milliliter (mℓ) glass vials, prepreserved with hydrochloric acid (HCl). They were collected as a grab sample by removing the 2.5-liter amber bottle and stopper assembly and slowly purging groundwater through the Teflon™ tubing using the peristaltic pump. The tubing was removed from the well, and the groundwater sample was drained by gravity into the 40-mℓ vials from the Teflon™ tubing that had been in the well.

2.3 GROUNDWATER ELEVATION SURVEY. Groundwater elevations were measured in all wells installed during site screening and IRA investigations, a total of 29 wells. The three new MicroWells have not been surveyed and were not included. One round of water-level measurements was taken using a water-level indicator in January 1997 (Table 2-4). The water-level data for the shallow wells represent the water table surface as is shown on Figure 2-4. These data indicate groundwater flow is toward the west with a groundwater gradient of 0.003 feet per foot (ft/ft) in the proximity of Building 1100. The gradient increases to 0.006 ft/ft nearer to Lake Druid. As reported in the FFI Report (ABB-ES, 1996c), the gradient during July 1996 (the rainy season) was 0.012 ft/ft. The significant change (decrease) in the gradient is likely due to the seasonal fluctuation in rainfall.

Table 2-4
Water Table and Sample Tubing Elevation and Depth Below Land Surface

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Well ID	TOC	Ground Surface	Water Level Elevation		Water Table (ft bls)		Tubing Inlet Elevation		Tubing Inlet (ft bls)	
			Jul 1996	Jan 1997	Jul 1996	Jan 1997	1st Round*	2nd Round*	1st Round*	2nd Round*
OLD-12-01A	110.97	111.50	105.41	104.14	6.09	7.36	103.14	NA	8.36	NA
OLD-12-02A	112.90	113.10	105.71	104.41	7.39	8.69	103.41	NA	9.69	NA
OLD-12-03A	113.34	113.50	105.77	104.42	7.73	9.08	103.42	NA	10.08	NA
OLD-12-04A	112.47	112.70	104.63	103.35	8.07	9.35	102.35	NA	10.35	NA
OLD-13-01A	110.22	110.40	105.09	104.01	5.31	6.39	103.01	100.40	7.39	10.00
OLD-13-02C	109.90	110.30	105.05	104.00	5.25	6.30	103.00	50.80	7.30	59.50
OLD-13-03A	111.88	112.10	105.55	104.43	6.55	7.67	103.43	103.10	8.67	9.00
OLD-13-04C	111.83	112.00	105.43	104.30	6.57	7.70	103.30	50.50	8.70	61.50
OLD-13-05A	110.20	110.50	104.68	103.58	5.82	6.92	102.58	100.50	7.92	10.00
OLD-13-06C	109.98	110.50	104.50	103.46	6.00	7.04	102.46	56.00	8.04	54.50
OLD-13-07A	108.71	109.00	104.15	103.28	4.85	5.72	102.28	98.00	6.72	11.00
OLD-13-08C	108.67	108.90	104.06	103.21	4.84	5.69	102.21	49.40	6.69	59.50
OLD-13-09A	105.99	103.50	101.92	101.71	1.58	1.79	99.99	NA	6.00	NA
OLD-13-10B	105.87	103.50	102.09	101.78	1.41	1.72	87.37	NA	18.50	NA
OLD-13-11C	105.98	103.10	102.37	101.95	0.73	1.15	46.48	NA	59.50	NA
OLD-13-12A	107.17	104.90	102.93	102.41	1.97	2.49	100.67	NA	6.50	NA
OLD-13-13B	107.69	104.90	103.09	102.48	1.81	2.42	89.19	NA	18.50	NA
OLD-13-14C	107.93	104.70	103.11	102.48	1.59	2.22	48.43	NA	59.50	NA
OLD-13-15A	108.74	106.20	NA	102.83	NA	3.37	NA	NA	NA	NA
OLD-13-16B	108.95	106.00	NA	102.75	NA	3.25	NA	NA	NA	NA
OLD-13-17C	109.08	105.90	NA	102.25	NA	3.65	NA	NA	NA	NA
OLD-13-OW1	107.69	104.90	NA	102.36	NA	2.54	NA	NA	NA	NA
OLD-13-OW2	108.14	105.50	NA	102.40	NA	3.10	NA	NA	NA	NA

See notes at end of table.

Table 2-4 (Continued)
Water Table and Sample Tubing Elevation and Depth Below Land Surface

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Well ID	TOC	Ground Surface	Water Level Elevation		Water Table (ft bls)		Tubing Inlet Elevation		Tubing Inlet (ft bls)	
			Jul 1996	Jan 1997	Jul 1996	Jan 1997	1st Round*	2nd Round*	1st Round*	2nd Round*
OLD-13-OW3	110.57	108.10	NA	102.69	NA	5.41	NA	NA	NA	NA
OLD-13-OW4	107.37	104.90	NA	102.27	NA	2.63	NA	NA	NA	NA
OLD-13-OW5	111.38	108.60	NA	103.14	NA	5.46	NA	NA	NA	NA
OLD-14-01A	109.00	109.20	105.94	104.82	3.26	4.38	103.82	NA	5.38	NA
OLD-14-02A	113.66	113.80	106.36	105.13	7.44	8.67	104.13	NA	9.67	NA
OLD-13-03A	113.29	113.60	105.96	104.66	7.64	8.94	103.66	NA	9.94	NA
OLD-13-04A	113.33	113.50	106.03	104.79	7.47	8.71	103.79	NA	9.71	NA

Notes: ID = identification.
TOC = top of casing.
ft bls = feet below land surface.
* = estimated value based on historical data.
NA = not applicable.

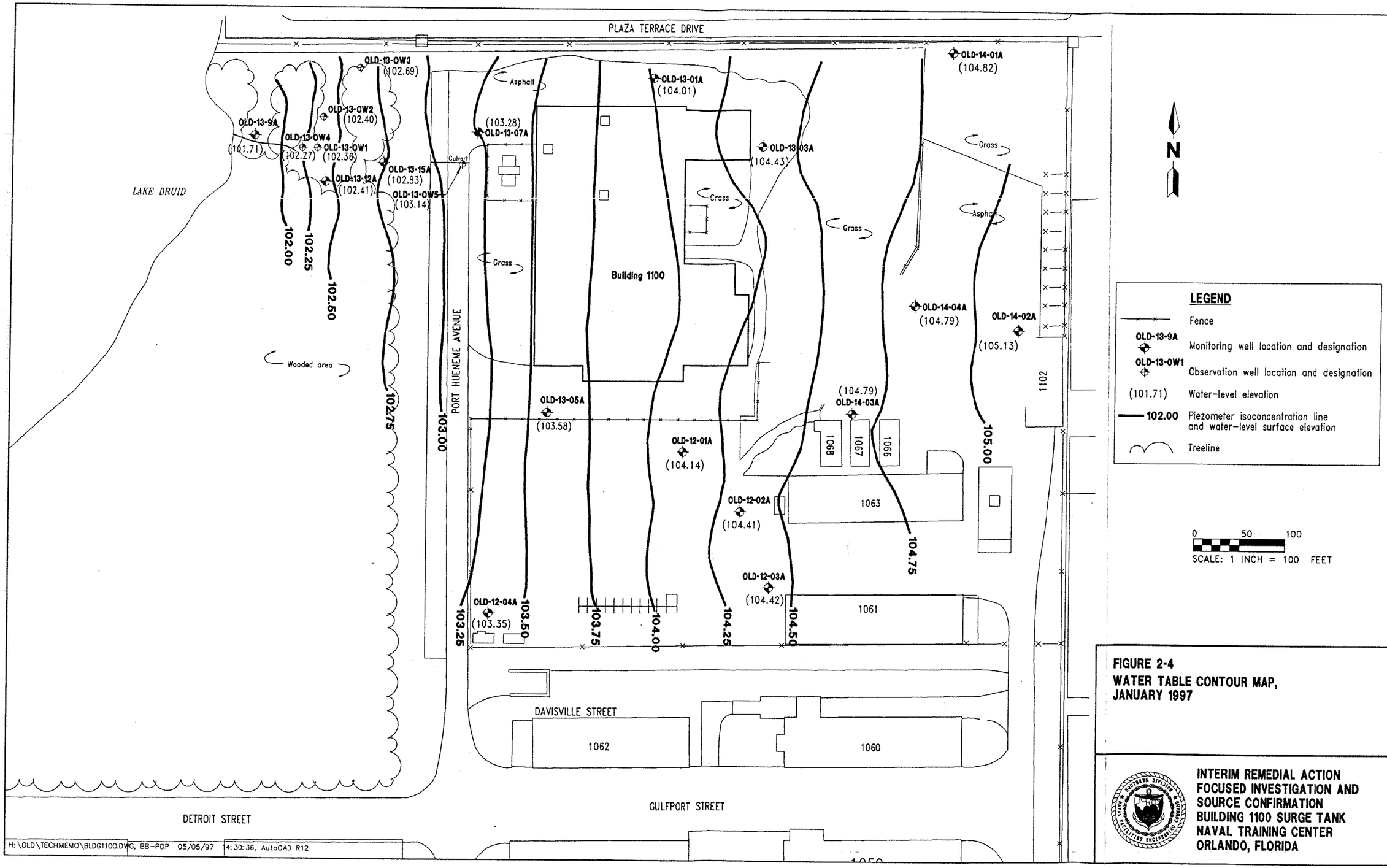

FIGURE 2-4
WATER TABLE CONTOUR MAP, JANUARY 1997

INTERIM REMEDIAL ACTION FOCUSED INVESTIGATION AND SOURCE CONFIRMATION BUILDING 1100 SURGE TANK NAVAL TRAINING CENTER ORLANDO, FLORIDA

00454F012

3.0 ANALYTICAL PROGRAM

This chapter summarizes the analytical program for onsite and off-site analysis of soil samples and groundwater samples collected during the IRA Focused Investigation/Source Confirmation, Building 1100, Surge Tank at OU 4. All samples were collected in accordance with procedures outlined in the NTC, Orlando Project Operations Plan (ABB-ES, 1994). In addition, this chapter assesses onsite and off-site data quality and useability and compares onsite and off-site analytical results.

3.1 ONSITE CHEMICAL ANALYSIS. Samples collected for onsite analysis were analyzed for target VOCs using a gas chromatograph (GC) field laboratory. The analytical methods used were based on standard USEPA Methods SW-846, 5030 (purge and trap preparation), 8000A (GC calibration), 8010A (halogenated volatile organics), and 8020 (benzene, toluene, ethylbenzene, and xylenes [BTEX]) with modifications for field analysis. Table 3-1 summarizes the sampling and analysis program for samples collected for onsite laboratory analysis.

3.1.1 Onsite Analytical Methodology Modifications to the USEPA 8010/8020 method are summarized in this subsection. Samples were analyzed using an SRI-8610B GC with a carbosieve trap and a Tenax trap. Two detectors, a 10.2 electron volt photoionization detector (PID) and a dry electrolytic conductivity detector (DELCD), were used.

3.1.2 Onsite Performance Criteria The quality control criteria for the onsite analytical method were established to monitor method performance. An initial three-point calibration for quantitation (low, mid-range, and high concentrations) was performed for each instrument. Target compounds and reporting limits are presented in Table 3-2. Instrument stabilities were monitored every 24 hours with a calibration standard at the mid-range concentration. The quantitation performance criterion for operation was the agreement of the check standard with the three-point calibration curve to within 30 percent. Field samples were to be analyzed only if no more than one compound per detector in the check standard exceeded these criteria. If the check standard did not meet this criterion, a second check standard was analyzed. If this second check standard did not meet criteria, a new calibration curve was prepared. The identities of the target compounds were based on comparison with the retention times for the standards. Retention time windows of plus or minus 3 percent were established, based on the most recent calibration curve. For some cases, the peak was so broad that a 3 percent retention time window was not adequate and operator judgment was applied.

Periodic method blanks of deionized water were analyzed to confirm that no target compounds were introduced by sample handling and analysis. The method blank criterion was met if no target compounds were present above the reporting limit for the instrument. A surrogate solution containing bromofluorobromine was injected into each sample at a known concentration to determine percentage recoveries. The recovery range of 50 to 150 percent was established for water samples, and the recovery range of 30 to 170 percent was established for soil samples as one of the operating criteria for onsite analysis.

Table 3-1
Summary of Sampling and Analysis Program for Samples Collected for Onsite Analysis

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Type of Sampling	Number of VOC Analyses
Soil (Direct Push)	60
Groundwater (Direct Push)	52
Field Duplicates	10
MS/MSD	5

Notes: VOC = volatile organic compounds.
MS/MSD = matrix spike/matrix spike duplicate.

Table 3-2
Target Compounds and Reporting Limits for Onsite Analysis

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Compound Name	Reporting Limit ($\mu g/\ell$)
1,1 Dichloroethene	4.0
trans-1,2-Dichloroethene	2.0
cis-1,2-Dichloroethene	2.0
Trichloroethene	2.0
Tetrachloroethene	2.0
Benzene	2.0
Toluene	2.0
Ethylbenzene	2.0
m/p-Xylene	4.0
o-Xylene	2.0

Note: $\mu g/\ell$ = micrograms per liter.

3.2 OFF-SITE CHEMICAL ANALYSIS. The overall precision and variability of the field screening confirmation program is assessed through the use of split samples, which are analyzed by both the ABB-ES field laboratory and a Naval Energy and Environmental Support Activity (NEESA) certified off-site laboratory (Quanterra, Inc.). Approximately 10 percent of the environmental samples collected were analyzed in both the onsite and off-site laboratory, consisting of eight TerraProbe℠ collected groundwater samples and seven TerraProbe℠ collected soil samples.

Presented below is an evaluation of the analytical results for these samples. Onsite samples were analyzed for purgeable VOCs using the field screening methodology described in Subsection 3.1.1. DPT soil samples were analyzed off-site for volatile organics using SW846 Method 8240B, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods." Direct-push technology (DPT) groundwater samples were analyzed off-site for low-level volatile organics using USEPA Method 524.2, "Methods for the Determination of Organic Compounds in Drinking Water." The analytical data have not been subjected to full independent data validation.

3.2.1 Off-site Data Comparison Methodology As there are no specific review criteria for split samples in both the NEESA and USEPA CLP documents, the laboratory duplicate precision criteria are utilized in this evaluation. It should be noted, however, that the use of this evaluation procedure may be overly conservative, especially with the DPT soil samples because they were not composited. Compositing environmental samples for determination of volatiles is generally not appropriate. Duplicate results for solid matrices have a greater variance than water matrices due to difficulties associated with collecting identical field samples. Thus, the soil samples submitted to both onsite and off-site laboratories are not considered true splits and will more likely result in a greater variability than laboratory duplicates. Split samples measure comparability of field and laboratory results; therefore, the results may have more variability than laboratory duplicates, which measure only laboratory performance.

The duplicate precision criteria are used routinely in the NEESA and USEPA CLP to evaluate comparability of laboratory duplicate samples. The same approach can be applied to field duplicates and split samples. Precision is a quantitative measure that is expressed as the relative percent difference (RPD) between analytical values for two samples from the same source divided by the average of their analytical values, calculated as follows:

$$RPD = \frac{D_1 - D_2}{\frac{1}{2}(D_1 + D_2)} \times 100 \qquad (1)$$

where: D_1 and D_2 are the reported values for the duplicate samples.

Laboratory duplicate precision criteria specify that RPDs be no greater than approximately 20 percent for water samples and approximately 35 percent for soil samples when both sample results are greater than five times the contract required quantitation limit (CRQL), or reported sample quantitation limit (SQL) if the SQL is greater than the CRQL.

If the sample and/or duplicate is less than five times the CRQL (or SQL), the absolute difference criteria, $|D_1 - D_2|$, where D_1 and D_2 are the reported values for the duplicate samples, is used. Field duplicates are qualified as estimated if the absolute difference between the analytical values is greater than the CRQL for water samples or twice the CRQL for soil samples. If the SQL is greater than the CRQL, the SQL value is substituted for CRQL. No calculations are made if both sample and duplicate are below quantitation limits, i.e., the nondetected parameter pairs are considered to be within control limits.

For this evaluation, the acceptance criteria for evaluating precision of field duplicates is an RPD of 20 for water matrices and an RPD of 35 for soil matrices. For sample results evaluated using absolute difference criteria, a |D| of less than the CRQL or less than the SQL (if SQL is greater than CRQL) is used for water samples and less than twice the CRQL or less than twice the SQL (if SQL is greater than CRQL) is used for soil samples.

3.3 STATISTICAL COMPARISON OF ONSITE AND OFF-SITE LABORATORY RESULTS. A comparison of the field screening results and the off-site laboratory results for VOCs is presented on Table C-1 (DPT groundwater) and Table C-2 (DPT soil) in Attachment C. Only those compounds with at least one detection in at least one sample (field lab or off-site laboratory) are shown and evaluated for each matrix (groundwater or soil). If all nondetected compounds analyzed in both the onsite and off-site laboratories are included in the calculation, the percent parameter pairs that are out of control for either the RPD or absolute difference criteria will be significantly reduced.

Analytical results of eight paired groundwater samples indicated fair precision. In 28 of 40 parameter pairs evaluated (70 percent), the screening data showing the presence or absence of a particular compound were confirmed by the off-site laboratory, providing a fair reliability in compound identification. The 28 pairs consisted of 15 pairs detected and 13 pairs not detected by both the onsite and off-site laboratories. Of the 12 remaining pairs with only one reported detection in either the onsite or off-site laboratory, 4 pairs are due to reporting limit differences (i.e., onsite results reported as less than 2 micrograms per liter [$\mu g/\ell$], while off-site results showed a detected concentration lower than this limit). RPD of |D| were calculated on 27 pairs. Twelve pairs (30 percent of the total) were out of control for the RPD or |D| criteria. However, 6 of the 12 pairs have the onsite results flagged with an "E" qualifier, indicating that the reported concentration exceeds the linear calibration range of the field equipment, thereby increasing the uncertainty of the onsite result.

Analytical results for three paired soil samples, where at least one compound was detected, also indicated a fair precision, although the low number of soil confirmation samples may not provide a statistically significant evaluation. Only two compounds were detected in either the paired onsite or off-site soil samples (PCE and TCE), providing a total of six pairs for the evaluation (all other compound pairs were nondetected and are therefore in control). Four of the six pairs (67 percent) were confirmed by the off-site laboratory (three detected pairs and one nondetected pair), indicating a fair reliability in compound identification by the onsite laboratory. However, 5 of 6 pairs where the RPD and |D| were calculated indicated all to be out of control, implying a poor precision in the quantitation of these compounds. The poor precision may largely be due to matrix variability inherent in the soil samples.

4.0 INVESTIGATIVE RESULTS

The investigative results are used to satisfy the objective of this focused investigation and to refine the SCM. The objective of the investigation is to assess if the subsurface underneath and around the surge tank and northwest corner of Building 1100 are a possible source area for VOC contamination to groundwater at OU 4.

4.1 SUBSURFACE SOIL CHARACTERIZATION. As described in Chapter 2.0, the TerraProbe℠ was used to collect soil samples from both vadose and saturated zones at 12 locations in and around the laundry facility, as shown on Figure 2-1. In order to meet the project objective of source confirmation, soil samples were screened in the field and analyzed in the laboratory for an indication of residual NAPL. The field soil screening procedures included FID analysis and indicator dye testing with red Sudan IV. If organic vapor concentrations tested greater than 1,000 ppm with the FID, then indicator dye testing would be performed on the soil sample. Residual NAPL would turn red if present, aiding visual identification. Concentrations from the FID screening did not exceed 25 ppm (Table 4-1); therefore, the field dye identification procedure for NAPL was not conducted.

4.1.1 Vadose Zone Soils Vadose zone soils were collected from each soil sampling location continuously from the surface down to the water table at 4-foot intervals. The vadose zone soil sampling results are provided in Tables 4-2 and 4-3, identified as "v" in the zone columns.

Vadose zone samples collected from beneath the laundry floor include approximately 4 feet of sand fill found between the foundation wall and supporting the concrete floor slab. This sand fill is located above the existing grade of the site. The natural vadose zone was approximately 8 feet thick in the vicinity of Building 1100 at the time of the investigation.

The highest VOC concentrations in vadose zone soils included 260 micrograms per kilogram (μg/kg) PCE at location U4P020, 158 μg/kg PCE at location U4P016, and 133 μg/kg PCE at location U4P014 (Table 4-2). These concentrations were all detected in the 4-foot interval immediately below the concrete floor and may represent contamination associated with minor releases to the floor of the laundry.

In general, soil VOC concentrations decreased with depth. The low concentrations detected may be present from the volatilization of a release some distance away and do not suggest the presence of residual NAPL at these sample locations.

4.1.2 Saturated Soils Saturated zone soils were collected from each soil sampling location, at 4-foot intervals, from the water table down to 28 feet bls or refusal. The saturated zone soil sampling results are provided in Tables 4-2 and 4-3, identified with "s" in the zone columns.

VOC concentrations in virtually all of the saturated soil samples were less than the concentrations detected in the vadose zone. The only exception was at 14 to 16 feet bls at location U4P015, where the off-site lab detected PCE at concentrations of 430 μg/kg (Table 4-3).

Table 4-1
FID Readings During TerraProbe℠ Soil Sampling

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Sample ID	Depth (feet)	FID Readings (ppm)	Sample ID	Depth (feet)	FID Readings (ppm)	Sample ID	Depth (feet)	FID Readings (ppm)
U4P01401F	0-4	10	U4P01703F	8-12	2	U4P02101	0-4	2
U4P01402F	4-8	0	U4P01704F	12-16	0	U4P02102	4-8	4
U4P01403F	10-12	0	U4P01705F	16-20	0	U4P02103	8-12	0
U4P01404F	14-16	0	U4P01706F	20-24	0	U4P02104	15-17	0
U4P01405F	18-20	0	U4P01707F	26-28	0	U4P02301F	0-4	0
U4P01406F	21-23	0	U4P01801F	0-4	1	U4P02302F	4-8	0
U4P01501F	0-4	2.5	U4P01802F	4-8	0	U4P02303F	8-12	0
U4P01502F	4-8	0	U4P01803F	8-12	10	U4P02304F	14-16	0
U4P01503F	8-12	0	U4P01901	0-4	10	U4P02305F	18-20	0
U4P01504F	14-16	0	U4P01902	4-8	25	U4P02306F	22-24	0
U4P01505F	18-20	8	U4P01903	8-12	3	U4P02401F	0-4	1
U4P01601F	0-4	9	U4P01904	14-16	0	U4P02402F	4-8	0
U4P01602F	4-8	6	U4P01905	18-19	0	U4P02403F	8-12	0
U4P01603F	8-12	3	U4P02001F	0-4	10	U4P02404F	14-16	0
U4P01604F	12-16	0	U4P02002F	4-8	15	U4P02405F	18-20	7
U4P01605F	16-20	0	U4P02003F	8-12	8	U4P02406F	22-24	0
U4P01606F	20-24	0	U4P02004F	14-16	0	U4P02407F	26-28	0
U4P01607F	24-28	0	U4P02005F	18-20	0	U4P02501F	0-4	5
U4P01701F	0-4	5	U4P02006F	22-24	0	U4P02502F	4-8	0
U4P01702F	4-8	6	U4P02007F	26-28	0	U4P02503F	8-12	0

See notes at end of table.

Table 4-1 (Continued)
FID Readings During TerraProbe℠ Soil Sampling

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Sample ID	Depth (feet)	FID Readings (ppm)	Sample ID	Depth (feet)	FID Readings (ppm)	Sample ID	Depth (feet)	FID Readings (ppm)
U4P02504F	14-16	0	U4P02507F	26-28	0	U4P02603F	8-12	0
U4P02505F	18-20	0	U4P02601F	0-4	0	U4P02604F	22-24	0
U4P02506F	22-24	0	U4P02602F	4-8	0	U4P02605F	26-28	0

Notes: ID = identification.
ppm = parts per million.
FID = flame ionization detector.

Table 4-2
Summary of Subsurface Soil Results for Onsite Analysis

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Sample ID	Depth (feet)	Zone	PCE	TCE	m/p-Xylene	o-Xylene	Sample ID	Depth (feet)	Zone	PCE	TCE	m/p-Xylene	o-Xylene
U4P01401F	0-4	V	82	<2	<4	<2	U4P01702F	4-8	V	10	<2	<4	<2
U4P01401FD	0-4	V	133	<2	<4	<2	U4P01703F	8-12	V	6	<2	<4	<2
U4P01402F	4-8	V	12	<2	<4	<2	U4P01704F	12-16	S	<2	<2	<4	<2
U4P01402FD	4-8	V	15	<2	<4	<2	U4P01705F	16-20	S	<2	<2	<4	<2
U4P01403F	10-12	V	4	<2	<4	<2	U4P01706F	20-24	S	<2	<2	<4	<2
U4P01404F	14-16	S	<2	<2	<4	<2	U4P01707F	26-28	S	<2	<2	<4	<4
U4P01405F	18-20	S	<2	<2	<4	<2	U4P01801F	0-4	V	4	<2	<4	<2
U4P01406F	21-23	S	<2	2	<4	<2	U4P01802F	4-8	V	<2	<2	<4	<2
U4P01501F	0-4	V	52	<2	<4	<2	U4P01803	8-12	V	<2	<2	<4	<2
U4P01502F	4-8	V	15	<2	<4	<2	U4P02001F	0-4	V	250E	<2	<4	<2
U4P01503F	8-12	V	12	<2	<4	<2	U4P02001FD	0-4	V	260E	<2	<4	<2
U4P01504F	14-16	S	15	<2	<4	<2	U4P02002F	4-8	V	40	<2	<4	<2
U4P01505F	18-20	S	<2	3	<4	<2	U4P02003F	8-12	V	20	<2	<4	<2
U4P01601F	0-4	V	158E	3	<4	<2	U4P02004F	14-16	S	<2	<2	<4	<2
U4P01602F	4-8	V	8	<2	<4	<2	U4P02005F	18-20	S	4	<2	<4	<2
U4P01603F	8-12	V	5	<2	<4	<2	U4P02006F	22-24	S	5	<2	<4	<2
U4P01604F	12-16	S	<2	<2	<4	<2	U4P02007F	26-28	S	<2	<2	<4	<2
U4P01605F	16-20	S	<2	<2	<4	<2	U4P02301F	0-4	V	<2	<2	<4	<2
U4P01606F	20-24	S	<2	<2	<4	<2	U4P02302F	4-8	V	<2	<2	<4	<2
U4P01607F	24-28	S	<2	<2	<4	<2	U4P02303F	8-12	S	<2	<2	<4	<2
U4P01701F	0-4	V	100	<2	<4	<2	U4P02304F	14-16	S	<2	<2	<4	<2

See notes at end of table.

Table 4-2 (Continued)
Summary of Subsurface Soil Results for Onsite Analysis

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Sample ID	Depth (feet)	Zone	PCE	TCE	m/p-Xylene	o-Xylene	Sample ID	Depth (feet)	Zone	PCE	TCE	m/p-Xylene	o-Xylene
U4P02305F	18-20	S	<2	<2	<4	<2	U4P02502F	4-8	V	6	<2	<4	<2
U4P02306F	22-24	S	<2	<2	<4	<2	U4P02503F	8-12	S	<2	<2	<4	<2
U4P02401F	0-4	V	15	<2	<4	<2	U4P02504F	14-16	S	<2	<2	<4	<2
U4P02401FD	0-4	V	15	<2	<4	<2	U4P02505F	18-20	S	<2	<2	<4	<2
U4P02402F	4-8	V	<2	<2	<4	<2	U4P02506F	22-24	S	<2	<2	<4	<2
U4P02403F	8-12	S	<2	<2	<4	<2	U4P02507F	26-28	S	<2	<2	<4	<2
U4P02404F	14-16	S	<2	<2	<4	<2	U4P02601F	0-4	V	<2	<2	9	<2
U4P02405F	18-20	S	<2	<2	<4	<2	U4P02602F	4-8	V	<2	<2	<4	<2
U4P02406F	22-24	S	<2	<2	<4	<2	U4P02603F	8-12	S	<2	<2	<4	4
U4P02407F	26-28	S	<2	<2	<4	<2	U4P02604F	22-24	S	<2	<2	<4	<2
U4P02501F	0-4	V	60	<2	<4	<2	U4P02605F	26-28	S	<2	<2	<4	<2

Notes: All results reported as micrograms per kilogram (µg/kg) soil dry weight.

ID = identification.
PCE = Tetrachloroethene.
TCE = Trichloroethene.
F = field.
D = duplicate sample.
V = vadose.
S = saturated.
E = estimated

Table 4-3
Summary of Subsurface Soil Results for Off-Site Analysis

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Sample ID	Depth (feet)	Zone	PCE	TCE
U4P01504	14-16	S	430	7.6
U4P01505	18-20	S	7.6	27
U4P01505D	18-20	S	26	27
U4P01604	12-16	S	<6	<6
U4P01901	0-4	V	41	<5.2
U4P01902	4-8	V	22	<5.1
U4P01903	8-12	V	<6.0	<6.0
U4P01904	14-16	S	<6.2	<6.2
U4P01905	18-19	S	<6.1	<6.1
U4P02004	14-16	S	<6.1	<6.1
U4P02101	0-4	V	31	<5.1
U4P02102	4-8	V	20	<5.2
U4P02103	8-12	V	<6.0	<6.0
U4P02104	15-17	S	<6.4	<6.4
U4P02301	0-4	V	<5.1	<5.1
U4P02301D	0-4	V	<5.1	<5.1
U4P02501	0-4	V	17	<5.2
U4P02501D	0-4	V	21	<5.4
U4P02602	4-8	V	<5.9	<5.9

Notes: All results reported as micrograms per kilogram (µg/kg).

ID = identification.
PCE = Tetrachloroethene.
TCE = Trichloroethene.
D = duplicate sample.
V = vadose.
S = saturated.
< = less than.

As with the vadose zone results, VOC concentrations in saturated soil do not indicate the presence of residual NAPL at these sample locations.

4.2 GROUNDWATER CHARACTERIZATION. As described in Chapter 2.0, the TerraProbe℠ was used to collect groundwater samples at 14 locations beneath the floor and around Building 1100, as shown on Figure 2-1. Groundwater samples were also collected from monitoring wells OLD-13-01A through OLD-13-08C and MicoWells OLD-13-18B through OLD-13-20B.

4.2.1 Groundwater Collected Via TerraProbe℠ Groundwater samples were collected via TerraProbe℠ and sent to either onsite and/or off-site laboratories for VOC analysis. Complete results are included in Attachments C and D and summarized in Tables 4-4 and 4-5.

The highest groundwater VOC concentrations were detected at locations U4Q014, U4Q015, and U4Q020 under the laundry, location U4Q026 between the laundry and the surge tank, and northwest (upgradient) of the laundry at location U4Q024 (primarily cis-DCE) (Table 4-4). At several locations, PCE and TCE were found at concentrations in the 1 to 3 milligrams per liter range. Many of these results were flagged with an "E" qualifier, indicating the reported concentration exceeded the linear calibration range of the field GC. In some of these cases (such as samples from location U4Q015), the confirmatory off-site analysis detected PCE and TCE at concentrations over an order of magnitude higher than the field GC (Table 4-5).

Typically, VOC concentrations in groundwater greater than one percent of the aqueous solubility limit are suggestive of NAPL presence (Cohen, et al., 1992). The highest VOC concentration in groundwater collected via TerraProbe℠ was 8,600 $\mu g/\ell$ PCE and 15,000 $\mu g/\ell$ TCE at location U4Q015 (16 to 18 feet bls, as measured by the off-site laboratory). Considering 15,000 $\mu g/\ell$ TCE is the byproduct of the degradation of 19,000 $\mu g/\ell$ PCE, the equivalent PCE concentration in this sample is approaching 20 percent of the theoretical solubility for PCE. Similar PCE concentrations were also detected at location U4Q020, based on a comparison of "E" qualified field GC data (Table 4-4). These results suggest a strong possibility that a source area of residual NAPL is present beneath the laundry, possibly at more than one location.

Also, due to the depth limitations of the TerraProbe℠, reaching refusal at approximately 30 feet bls, vertical contaminant delineation at many locations was not possible. Locations such as U4Q015, U4Q016, and U4Q020 had some their highest contaminant concentration results at the last interval sampled. Data "gaps" left in the vertical delineation will be addressed in the OU 4 RI.

Finally, the groundwater sampling data indicate the concentration ratios of PCE/TCE/DCE (Tables 4-4 and 4-5) at different locations are somewhat contradictory, for instance:

- location U4Q015 sampling results indicate mostly PCE contamination at relatively high concentrations, whereas location U4Q014, just 20 feet north (cross gradient), has very little PCE and a significant amount of TCE and DCE;

Table 4-4
Summary of TerraProbe℠ Groundwater Results for Onsite Analysis

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Sample No.	Depth (feet)	PCE	TCE	cis-DCE	trans-DCE	Sample No.	Depth (feet)	PCE	TCE	cis-DCE	trans-DCE
U4Q01401F	11-13	440E	230E	45	<2	U4Q02005F	28-30	600E	4	20	<2
U4Q01402F	16-18	50	400E	250E	6	U4Q02101F	13-15	25	<2	10	<2
U4Q01402FD	16-18	20	440E	240E	5	U4Q02102F	16-18	8	<2	6	<2
U4Q01403F	20-22	45	500E	200E	7	U4Q02102FD	16-18	9	<2	6	<2
U4Q01404F	24-26	30	200E	300E	15	U4Q02301F	12-14	<2	<2	<2	<2
U4Q01501F	12-14	800E	200E	8	<2	U4Q02302F	16-18	<2	<2	<2	<2
U4Q01502F	16-18	550E	640E	50	5	U4Q02303F	20-22	10	<2	<2	<2
U4Q01503F	20-22	3362E	1000E	30	5	U4Q02401F	12-14	<2	<2	20	<2
U4Q01601F	12-14	270E	15	2	<2	U4Q02402F	16-18	7	5	70	4
U4Q01602F	16-18	60	4	<2	<2	U4Q02403F	20-22	50	170E	450E	30
U4Q01603F	20-22	120E	<2	3	<2	U4Q02403FD	20-22	40	90	700E	30
U4Q01604F	24-26	50	<2	<2	<2	U4Q02404F	24-26	150E	<2	200E	8
U4Q01605F	28-30	600E	<2	<2	<2	U4Q02405F	28-30	<2	<2	<2	<2
U4Q01701F	12-14	5	<2	7	<2	U4Q02501F	12-14	<2	<2	<2	<2
U4Q01702F	16-18	10	<2	4	<2	U4Q02502F	16-18	<2	<2	<2	<2
U4Q01703F	20-22	12	<2	<2	<2	U4Q02503F	20-22	<2	<2	3	<2
U4Q01704F	24-26	11	<2	<2	<2	U4Q02504F	24-26	98	13	112E	6
U4Q01705F	28-30	17	<2	<2	<2	U4Q02505F	28-30	6	<2	<2	3
U4Q01705FD	28-30	10	<2	<2	<2	U4Q02601F	12-14	320E	<2	<2	<2
U4Q01801F	12-14	7	<2	5	<2	U4Q02602F	16-18	84	<2	11	<2
U4Q02001F	12-14	400E	260E	140E	3	U4Q02602FD	16-18	66	<2	11	<2
U4Q02002F	16-18	1,00E	25	60	<2	U4Q02603F	20-22	110E	2	14	<2
U4Q02003F	20-22	2,350E	100	65	<2	U4Q02604F	24-26	2,100	30	40	<2
U4Q02003FD	20-22	2,370E	105E	60	<2	U4Q02605F	28-30	1,100E	100	3	<2
U4Q02004F	24-26	2000E	20	30	<2	U4Q02701F	12-14	<2	<2	<2	6

See notes at end of table.

Table 4-4 (Continued)
Summary of TerraProbe℠ Groundwater Results for Onsite Analysis

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Sample No.	Depth (feet)	PCE	TCE	cis-DCE	trans-DCE	Sample No.	Depth (feet)	PCE	TCE	cis-DCE	trans-DCE
U4Q02702F	16-18	5	<2	<2	2	U4Q02801F	12-14	<2	<2	11	2
U4Q02703F	20-22	4	<2	<2	5	U4Q02802F	18-20	3	<2	12	<2
U4Q02704F	24-26	<2	<2	<2	3	U4Q02803F	24-26	3	<2	3	<2
U4Q02705F	28-30	2	<2	<2	<2	U4Q02804F	30-32	5	<2	<2	2

Notes: All results reported as micrograms per liter ($\mu g/\ell$)

PCE = tetrachloroethene.
TCE = trichloroethene.
cis-DCE = cis-dichloroethene.
trans-DCE = trans-dichloroethene.
< = less than.
E = estimated.

Table 4-5
Summary of Groundwater Results for Off-Site Analysis

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Sample ID	Depth (feet)	PCE	TCE	cis-DCE
U4Q01501	12-14	14,000	440	<300
U4Q01502	16-18	6100	11,000	<250
U4Q01502D	16-18	8600	15,000	<300
U4Q01601	12-14	38	3.9	3
U4Q01901	12-14	5.4	0.24	<0.5
U4Q01902	16-18	2.4	0.12	<0.5
U4Q02101	13-15	1.4	0.58	1.1
U4Q02102	16-18	1.1	0.22	0.9
U4Q02403	20-22	33	90	880
U4Q02403D	20-22	30	86	830
U4Q02505	28-30	<0.5	<0.5	0.99
U4Q02704	24-26	<0.5	<0.5	0.13

Notes: All results reported in micrograms per liter ($\mu g/\ell$).

ID = identification.
D = duplicate.
PCE = tetrachloroethene.
TCE = trichloroethene.
cis-DCE = cis-1,2-dichloroethene.
< = less than.

- location U4Q020, directly upgradient of location U4Q014 (60 feet east), is primarily contaminated with PCE at high concentrations and very little TCE and DCE; and

- location U4Q024, upgradient of U4Q014 and U4Q020, has high DCE concentrations, when compared to the amounts of PCE and TCE.

These inconsistencies require further evaluation and will also be included in the OU 4 RI.

4.2.2 **Groundwater Collected from Monitoring Wells and MicroWells** Groundwater samples from monitoring wells and MicroWells listed in Table 4-6 were sent to the off-site laboratory for VOC and inorganic (TAL metals) analysis; analytical results are included in Attachment E.

The results from monitoring well and MicroWell sampling generally indicate lower groundwater VOC concentrations than those collected from TerraProbe℠ sampling. This may be attributed to the monitoring well having longer screen lengths along with the stagnant groundwater causing dilution of the sample. Also, the MicroWells were set in the same locations as the TerraProbe℠ groundwater sample collection. These wells are approximately 4 to 5 feet deeper than the last TerraProbe℠ collection interval and may be near the lower depth limit of contamination.

The highest VOC concentration detected in groundwater from a monitoring well was 28,000 parts per billion (ppb) PCE, collected from OLD-13-07A, located off the northwest corner of Building 1100. This was a considerable change when compared to the only other round of monitoring well sampling in April 1995, which resulted in 680 ppb PCE. This significant increase could be attributed to source migration to very near the monitoring well. If source migration occurred, it may have been enhanced by some of the investigative work and will be a concern for future assessments. The 28,000 ppb PCE concentration approaches 20 percent of the solubility for that compound, indicating a very strong argument for NAPL presence.

Another noticeable concentration change would be the sampling of monitoring well OLD-13-08C (deep), which resulted in a PCE concentration of 14 ppb (Florida maximum contaminant limit [MCL] for PCE is 3.0 ppb). Previous deep monitoring well sampling results never indicated VOC concentrations above the MCL. This deep presence of PCE will be evaluated in the OU 4 RI.

TAL metals samples were collected from the groundwater monitoring wells to gain further data regarding inorganic constituents around Building 1100. These data will be used to support any treatability studies and/or source remediation activities near the building. These inorganic data will also be more extensively evaluated in the OU 4 RI.

Table 4-6
Summary of Groundwater Analysis from Monitoring Wells and MicroWells

Technical Memorandum
Interim Remedial Action, Focused Investigation/Source Confirmation,
Building 1100 Surge Tank, Operable Unit 4,
Naval Training Center
Orlando, Florida

Well ID	Date	Sample ID	PCE	TCE	cis-DCE
OLD-13-01A	3/9/95	13G00101	250	16 J	29 J
	3/24/97	13G00102	46	14	30
OLD-13-02C	4/6/95	13G00201	<.5	<.5	<.5
	3/24/97	13G00202	14	<.5	<.5
OLD-13-03A	4/6/95	13G00301	16	3 J	5.6
	3/24/97	13G00302	9.3	5.2	7.3
OLD-13-04C	4/6/95	13G00401	<.5	<.5	<.5
	3/24/97	13G00402	.13	<.5	<.5
0LD-13-05A	3/9/95	13G00501	7	3	6
	3/24/97	13G00502	1.5	.21	<.5
OLD-13-06C	4/6/95	13G00601	<.5	<.5	<.5
	3/24/97	13G00602	<.5	<.5	<.5
OLD-13-07A	4/6/95	13G00701	680	52	38 J
	3/25/97	13G00702	28,000	<620	<620
OLD-13-08C	4/6/95	13G00801	.2	<.5	.1 J
	3/25/97	13G00802	.18	<.5	<.5
OLD-13-18B	3/25/97	U4G01801	420	2.7	10
OLD-13-19B	3/25/97	U4G01901	9.3	2.3	.31
OLD-13-20B	3/25/97	U4G02001	6,900	910	<150

Notes: All results reported as micrograms per liter ($\mu g/\ell$).

J = estimated value.
ID = identification.
PCE = tetrachloroethene.
TCE = trichloroethene.
DCE = dichloroethene.
< = less than.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Sampling results from the IRA focused investigation/source confirmation, Building 1100 Surge Tank, OU 4 at NTC, Orlando indicate that VOCs are present within the surficial aquifer, beneath the floor and on the north side of Building 1100. Based on these results, this chapter will refine the SCM and provide conclusions and recommendations regarding the surge tank as a possible source area.

5.1 CONCLUSIONS AND RECOMMENDATIONS. This source confirmation investigation was the first specific attempt at source characterization at OU 4, with the objective to confirm the surge tank as a primary source of VOCs.

Previous investigations immediately downgradient of the surge tank detected VOCs in groundwater at concentrations consistent with a nearby source, leading to speculation that releases from the surge tank itself may have been the source of the highest VOC concentrations in groundwater. However, limited site screening sampling of the areas north and east of the laundry (upgradient) also detected VOCs in groundwater, at concentrations lower than near the surge tank.

The groundwater data collected during this focused investigation/source confirmation indicate that a primary source area (perhaps several) likely exists beneath the floor of the laundry. PCE was detected in groundwater at concentrations over 10 percent of the theoretical solubility limit, strongly suggesting the presence of residual NAPL beneath the laundry. The source(s) under the laundry would be in addition to the area near the surge tank. The recent detection of 28,000 $\mu g/\ell$ PCE in monitoring well U4-OLD-07A (Table 4-6) is suggestive of a source in the vicinity of this monitoring well.

The presence of residual NAPL was not confirmed by the soil samples collected. The maximum PCE concentration detected in subsurface soil was 430 micrograms per kilogram, rather than the percent concentrations expected for residual product. However, the absence of high soil VOC concentrations does not imply that residual product is not present. Controlled field releases of PCE at the University of Waterloo have shown that NAPL migration is strongly influenced by even subtle variations in porous media properties. This can lead to extremely heterogenous distribution of residual NAPL at the millimeter scale, making it very difficult to directly measure residual saturation and accurately estimate the mass of contamination in the subsurface (Poulsen et al., 1992).

The investigative results from the IRA focused investigation/source confirmation, Building 1100 Surge Tank imply that there may be several source areas for groundwater VOC contamination present at OU 4. Although an additional recirculation well in the vicinity of the surge tank may be beneficial, it will not likely accelerate remediation of OU 4 if other major upgradient and cross-gradient sources are not also addressed. Several additional recirculation wells would likely be required. More economical multiple source area remedies will be evaluated in the upcoming OU 4 RI/FS task .

5.2 REFINED SITE CONCEPTUAL MODEL. The SCM is a basis for communication of a clear understanding of a contaminant release to the environment. It is

continually refined as additional information and results from each field investigation become available.

Initially the SCM considered two scenarios for contaminant source release and two potential release pathways for contaminant migration. The contaminant source release scenarios included the following:

1. operational spills either on the ground surface outside the building or in the drain system, and/or

2. seepage from the surge tank located to the west of the facility.

The pathways initially considered were as follows:

1. the transport of the chlorinated solvents by stormwater runoff into the swale and culvert and, thereby, directed to the lake; and

2. seepage of chlorinated solvents through the soil and into the groundwater, and thus migrating to the lake.

The IRA Focused Field Investigation determined the pathway for VOC contaminant migration to Lake Druid to be groundwater, where the dissolved phase VOCs have migrated laterally (west) from the laundry toward the lake through advective transport and dispersion.

This focused investigation/source confirmation indicates that multiple source areas are likely contributing to the VOCs detected in groundwater. However, the only addition to the SCM would be the confirmation of VOCs at high concentrations under and to the north of Building 1100. The SCM, shown as Figure 1-2, will remain unchanged at this time. Refinement of the SCM will continue through site closure for OU 4.

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ABB-ES. 1996b. *Letter Report/Operable Unit 4 Interim Remedial Action Treatability Study: Pumping Test implementation and Results, Naval Training Center, Orlando, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (October).

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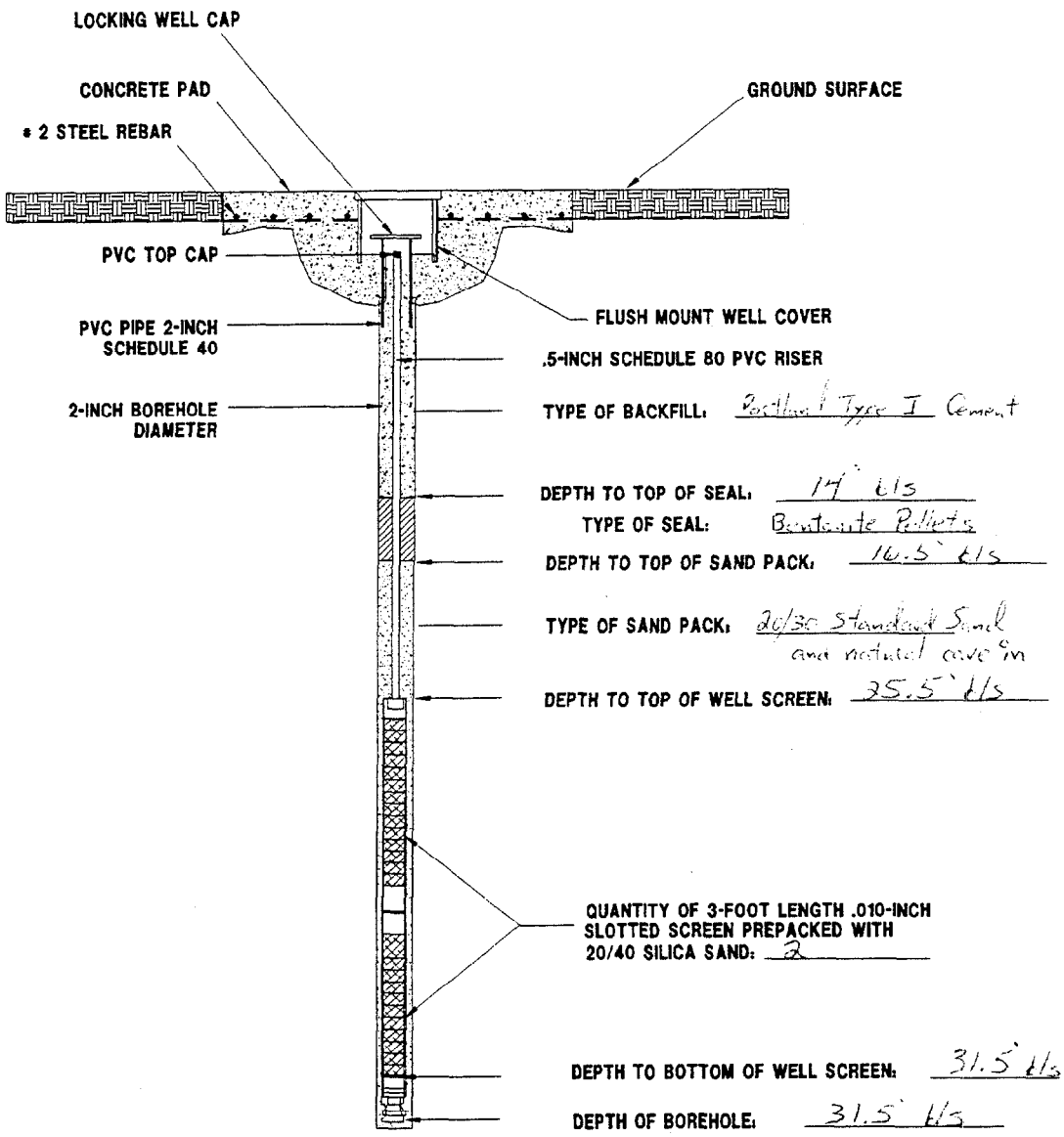
APPENDIX A

MICROWELL CONSTRUCTION DIAGRAMS

MICROWELL CONSTRUCTION DIAGRAM

PROJECT: BRAC NTC Orlando
PROJECT NO: 8545.54
WELL ID: OLD-13-18
FIELD PERSONNEL: John Nash

SITE NAME: OU 4
DATE INSTALLED: 3/14/97
INSTALLATION METHOD: Terra Probe™

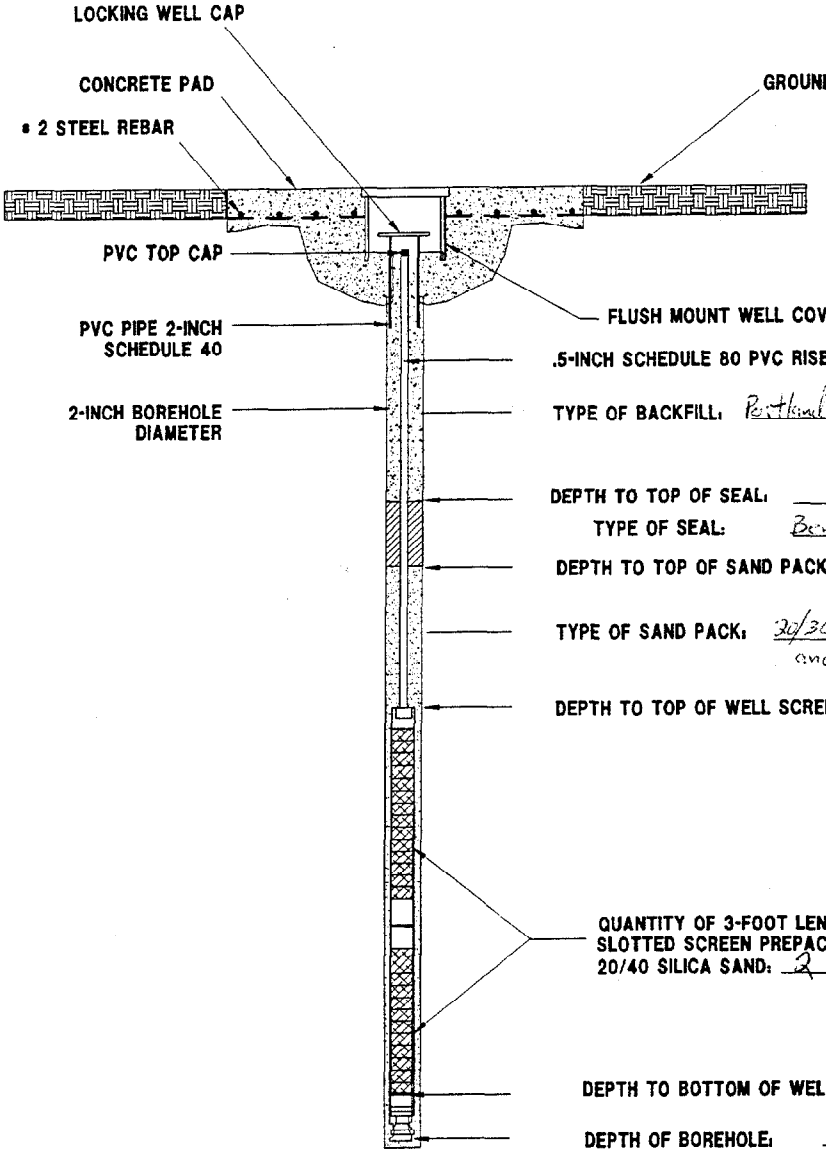


NOT TO SCALE

MICROWELL CONSTRUCTION DIAGRAM

PROJECT: BRAC NTC Orlando
PROJECT NO: 8545-59
WELL ID: OUD-13-19
FIELD PERSONNEL: John Nash

SITE NAME: OU 4
DATE INSTALLED: 3/14/97
INSTALLATION METHOD: Direct Push SH

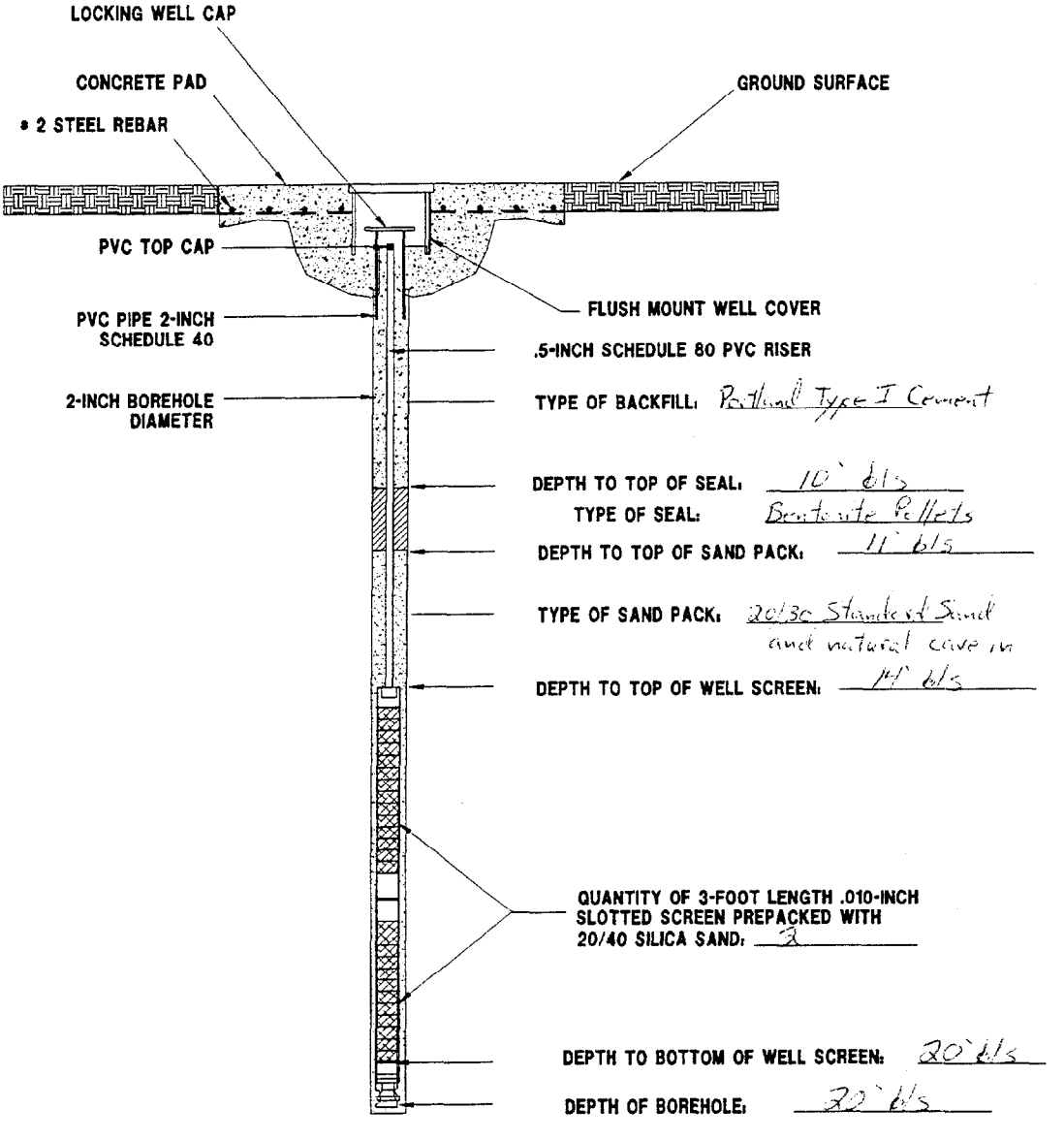


NOT TO SCALE

MICROWELL CONSTRUCTION DIAGRAM

PROJECT: BRAC NTC Orlando
PROJECT NO: 8545.54
WELL ID: OLD-13-20
FIELD PERSONNEL: John Nash

SITE NAME: OU 4
DATE INSTALLED: 3/14/97
INSTALLATION METHOD: Terra Probe 3m



NOT TO SCALE

APPENDIX B

MONITORING WELL/MICROWELL SAMPLING LOGS

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 08545.59
Sample Location ID: OLD-13-01
Time: Start: 14:29 End: 15:10
Point of Interest: OU4
Date: 3/24/99
Signature of Sampler:

Water Level/Well Data

Well Depth 15 Ft. — ___ Measured, ✓ Historical
✓ Top of Well, ___ Top of Protective Casing
Well Riser Stick-up 0 Ft. (from ground)
Protective ___ Ft. Casing/Well Difference
Protective ___ Ft. Casing

Depth to Water 6.42 Ft.
Well Material: ✓ PVC, ___ SS
Well Locked?: ✓ Yes, ___ No
Well Dia. ✓ 2 inch, ___ 4 inch, ___ 6 inch
Water Level Equip. Used: ✓ Elect. Cond. Probe, ___ Float Activated, ___ Press. Transducer

Height of Water Column 8.58 Ft. X ✓ .16 Gal/Ft. (2 in.), ___ .65 Gal/Ft. (4 in.), ___ 1.5 Gal/Ft. (6 in.), ___ Gal/Ft. (___ in.) = 1.37 Gal/Vol
7 Total Gal Purged

Well Integrity:

	Yes	No
Prot. Casing Secure	✓	
Concrete Collar Intact	✓	
Other		

Equipment Documentation

Purging/Sampling Equipment Used :

(✓ If Used For) Purging	Sampling		Equipment ID
✓	✓	Peristaltic Pump	
		Submersible Pump	
		Bailer	
		PVC/Silicon Tubing	
✓	✓	Teflon/Silicon Tubing	
		Airlift	
		Hand Pump	
		In-line Filter	
		Press/Vac Filter	

Decontamination Fluids Used :

(✓ All That Apply at Location)
___ Methanol (100%)
___ 25% Methanol/75% ASTM Type II water
✓ Deionized Water
___ Liquinox Solution
___ Hexane
___ HNO_3/D.I. Water Solution
___ Potable Water
___ None

Field Analysis Data

Ambient Air VOC ___ ppm Well Mouth ___ ppm Field Data Collected ___ In-line ✓ In Container
Sample Observations: ___ Turbid ✓ Clear ___ Cloudy ___ Colored ___ Odor

Purge Data	@ 1 Gal.	@ 3 Gal.	@ 5 Gal.	@ 6 Gal.	@ ___ Gal.
Temperature, Deg. C	26.3	25.9	25.4	25.5	
pH, units	6.53	6.41	6.41	6.44	
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	315	302	302	301	
Oxidation - Reduction, +/- mv					
~~Dissolved Oxygen, ppm~~ Turbidity (NTU)	11.93	13.98	6.51	4.49	

Sample Collection Requirements

(✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA		HCL	2x40mL	✓	13000102 / / /
SVOA		4°C			/ / /
Pest/PCB		4°C			/ / /
Inorganics		HNO_3	1 Liter	✓	13000103 / / /
Explosives		4°C			/ / /
TPH		H_2SO_4			/ / /
TOC		H_2SO_4			/ / /
Nitrate		H_2SO_4			/ / /

Notes:
7 gallons purged

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 0845.54
Sample Location ID: OLD-13-02
Time: Start: 14:31 End: 15:20
Point of Interest: OU4
Date: 3/24/97
Signature of Sampler:

Water Level/Well Data

Well Depth 62 Ft. — ___ Measured / ✓ Historical — ✓ Top of Well / ___ Top of Protective Casing ___ — Well Riser Stick-up (from ground) 0 Ft. — Protective Casing/Well Difference ___ Ft. — Protective Casing ___ Ft.

Depth to Water 6.12 Ft. — Well Material: ✓ PVC / ___ SS / ___ — Well Locked?: ✓ Yes / ___ No — Well Dia. ✓ 2 inch / ___ 4 inch / ___ 6 inch / ___ ___ — Water Level Equip. Used: ✓ Elect. Cond. Probe / ___ Float Activated / ___ Press. Transducer / ___ ___

Height of Water Column 55.88 Ft. X ✓ .16 Gal/Ft. (2 in.) / ___ .65 Gal/Ft. (4 in.) / ___ 1.5 Gal/Ft. (6 in.) / ___ ___ Gal/Ft. (___ in.) = 8.94 Gal/Vol / 12 Total Gal Purged

Well Integrity:

	Yes	No
Prot. Casing Secure	✓	___
Concrete Collar Intact	✓	___
Other ___	___	___

Equipment Documentation

Purging/Sampling Equipment Used :

(✓ If Used For) Purging	Sampling		Equipment ID
___	✓	Peristaltic Pump	___
___	___	Submersible Pump	___
___	___	Bailer	___
___	___	PVC/Silicon Tubing	___
✓	✓	Teflon/Silicon Tubing	___
___	___	Airlift	___
___	___	Hand Pump	___
___	___	In-line Filter	___
___	___	Press/Vac Filter	___
___	___		___

Decontamination Fluids Used :

(✓ All That Apply at Location)
___ Methanol (100%)
___ 25% Methanol/75% ASTM Type II water
✓ Deionized Water
___ Liquinox Solution
___ Hexane
___ HNO_3/D.I. Water Solution
___ Potable Water
___ None
___ ___
___ ___

Field Analysis Data

Ambient Air VOC ___ ppm Well Mouth ___ ppm Field Data Collected ___ In-line / ✓ In Container

Sample Observations: ___ Turbid / ✓ Clear / ___ Cloudy / ___ Colored / ___ Odor

Purge Data	@ 2 Gal.	@ 6 Gal.	@ 8.5 Gal.	@ ___ Gal.	@ ___ Gal.
Temperature, Deg. C	26.3	25.8	26.1		
pH, units	5.00	4.90	4.92		
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	137	138	137		
Oxidation - Reduction, +/- mv					
Dissolved Oxygen, ppm	10.91	3.77	4.43		
Turbidity (NTU)					

Sample Collection Requirements

(✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA	___	HCL	2x40mL	✓	13000202 / ___ / ___
SVOA	___	4OC	___	___	___ / ___ / ___ / ___
Pest/PCB	___	4OC	___	___	___ / ___ / ___ / ___
Inorganics	___	HNO_3	1 Liter	✓	13000202 / ___ / ___
Explosives	___	4°C	___	___	___ / ___ / ___ / ___
TPH	___	H_2SO_4	___	___	___ / ___ / ___ / ___
TOC	___	H_2SO_4	___	___	___ / ___ / ___ / ___
Nitrate	___	H_2SO_4	___	___	___ / ___ / ___ / ___

Notes: 12 gallons purged

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 08545.54
Sample Location ID: OLD-13-03
Time: Start: 11:14 End: 11:45
Point of Interest: OU 1
Date: 3/24/99
Signature of Sampler: [signature]

Water Level/Well Data

Well Depth 14 Ft. — ___ Measured, ✓ Historical
✓ Top of Well, ___ Top of Protective Casing ___ ___
Well Riser Stick-up 0 Ft. (from ground)
Protective ___ Ft. Casing/Well Difference
Protective ___ Ft. Casing

Depth to Water 7.72 Ft.
Well Material: ✓ PVC, ___ SS, ___
Well Locked?: ✓ Yes, ___ No
Well Dia. ✓ 2 inch, ___ 4 inch, ___ 6 inch, ___ ___
Water Level Equip. Used: ✓ Elect. Cond. Probe, ___ Float Activated, ___ Press. Transducer, ___ ___

Height of Water Column 6.25 Ft. X ✓ .16 Gal/R. (2 in.), ___ .65 Gal/R. (4 in.), ___ 1.5 Gal/R. (6 in.), ___ ___ Gal/R. (___ in.) = 1.00 Gal/Vol; 6 Total Gal Purged

Well Integrity: Yes / No
Prot. Casing Secure: ✓ / ___
Concrete Collar Intact: ✓ / ___
Other ___ ___ / ___

Equipment Documentation

Purging/Sampling Equipment Used :

(✓ If Used For) Purging	Sampling		Equipment ID
✓	✓	Peristaltic Pump	
—	—	Submersible Pump	
—	—	Bailer	
—	—	PVC/Silicon Tubing	
✓	✓	Teflon/Silicon Tubing	
—	—	Airlift	
—	—	Hand Pump	
—	—	In-line Filter	
—	—	Press/Vac Filter	
—	—		

Decontamination Fluids Used :

(✓ All That Apply at Location)
___ Methanol (100%)
___ 25% Methanol/75% ASTM Type II water
✓ Deionized Water
___ Liquinox Solution
___ Hexane
___ HNO_3/D.I. Water Solution
___ Potable Water
___ None
___ ___
___ ___

Field Analysis Data

Ambient Air VOC ___ ppm Well Mouth ___ ppm Field Data Collected ___ In-line ✓ In Container
Sample Observations: ___ Turbid ✓ Clear ___ Cloudy ___ Colored ___ Odor

Purge Data	@ 2 Gal.	@ 4 Gal.	@ 5 Gal.	@ ___ Gal.	@ ___ Gal.
Temperature, Deg. C	26.2	26.1	25.1		
pH, units	6.36	6.40	6.34		
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	393	392	392		
Oxidation - Reduction, +/- mv					
~~Dissolved Oxygen, ppm~~ Turbidity (NTU)	3.14	3.33	2.97		

Sample Collection Requirements

(✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA	___	HCL	2 x 40 mL	✓	BG090302 / ___ / ___
SVOA	___	4°C		___	___ / ___ / ___ / ___
Pest/PCB	___	4°C		___	___ / ___ / ___ / ___
Inorganics	___	HNO_3	1 Liter	✓	BG090302 / ___ / ___
Explosives	___	4°C		___	___ / ___ / ___ / ___
TPH	___	H_2SO_4		___	___ / ___ / ___ / ___
TOC	___	H_2SO_4		___	___ / ___ / ___ / ___
Nitrate	___	H_2SO_4		___	___ / ___ / ___ / ___

Notes: 6 gallons purged

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 08545.59
Sample Location ID: OLD-13-04
Time: Start: 11:00 End: 12:00
Point of Interest: OU 4
Date: 3/24/97
Signature of Sampler:

Water Level/Well Data

Well Depth 64 Ft. — ___ Measured, ✓ Historical
✓ Top of Well, ___ Top of Protective Casing ___ ___
Well Riser Stick-up (from ground) 0 Ft.
Protective Casing/Well Difference ___ Ft.
Protective Casing ___ Ft.

Depth to Water 7.78 Ft.
Well Material: ✓ PVC, ___ SS ___
Well Locked?: ✓ Yes, ___ No
Well Dia. ✓ 2 inch, ___ 4 inch, ___ 6 inch ___ ___
Water Level Equip. Used: ✓ Elect. Cond. Probe, ___ Float Activated, ___ Press. Transducer ___ ___

Height of Water Column 56.22 Ft. X ✓ .16 Gal/Ft. (2 in.), ___ .65 Gal/Ft. (4 in.), ___ 1.5 Gal/Ft. (6 in.), ___ ___ Gal/Ft. (___ in.) = [9.00 Gal/Vol; 10 Total Gal Purged]

Well Integrity: Yes / No
Prot. Casing Secure: ✓ / ___
Concrete Collar Intact: ✓ / ___
Other ___ / ___

Equipment Documentation

Purging/Sampling Equipment Used :

(✓ If Used For) Purging	Sampling		Equipment ID
✓	✓	Peristaltic Pump	
—	—	Submersible Pump	
—	—	Bailer	
—	—	PVC/Silicon Tubing	
✓	✓	Teflon/Silicon Tubing	
—	—	Airlift	
—	—	Hand Pump	
—	—	In-line Filter	
—	—	Press/Vac Filter	
—	—		

Decontamination Fluids Used :

(✓ All That Apply at Location)
___ Methanol (100%)
___ 25% Methanol/75% ASTM Type II water
✓ Deionized Water
___ Liquinox Solution
___ Hexane
___ HNO_3/D.I. Water Solution
___ Potable Water
___ None
___ ___
___ ___

Field Analysis Data

Ambient Air VOC ___ ppm Well Mouth ___ ppm Field Data Collected ___ In-line, ✓ In Container
Sample Observations: ___ Turbid, ✓ Clear, ___ Cloudy, ___ Colored, ___ Odor

Purge Data	@ 4 Gal.	@ 6 Gal.	@ 8 Gal.	@ 9 Gal.	@ ___ Gal.
Temperature, Deg. C	22.2	25.7	26.3	26.6	
pH, units	5.09	5.05	5.02	4.91	
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	152	150	140	142	
Oxidation - Reduction, +/- mv					
~~Dissolved Oxygen, ppm~~ Turbidity (NTU)	4.38	5.60	3.80	3.03	

Sample Collection Requirements

(✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA	___	HCL	4x40 mL	✓	13600402 , 13600402D
SVOA	___	4°C		___	___ / ___ / ___ / ___
Pest/PCB	___	4°C		___	___ / ___ / ___ / ___
Inorganics	___	HNO_3,	2 x 1 Liter	✓	13600403 , 13600403D
Explosives	___	4°C		___	___ / ___ / ___ / ___
TPH	___	H_2SO_4		___	___ / ___ / ___ / ___
TOC	___	H_2SO_4		___	___ / ___ / ___ / ___
Nitrate	___	H_2SO_4		___	___ / ___ / ___ / ___

Notes: 10 gallons purged

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 085455.54
Sample Location ID: OLD-13-05
Time: Start: 13:12 End: 14:10

Point of Interest: OU4
Date: 3/24/97
Signature of Sampler:

Water Level/Well Data

Well Depth 15 Ft. — ___ Measured, ✓ Historical
✓ Top of Well, ___ Top of Protective Casing
Well Riser Stick-up (from ground) 0 Ft.
Protective Casing/Well Difference ___ Ft.
Protective Casing ___ Ft.

Depth to Water 6.22 Ft.
Well Material: ✓ PVC, ___ SS
Well Locked?: ✓ Yes, ___ No
Well Dia.: ✓ 2 inch, ___ 4 inch, ___ 6 inch
Water Level Equip. Used: ✓ Elect. Cond. Probe, ___ Float Activated, ___ Press. Transducer

Height of Water Column 8.28 Ft. X (✓ .16 Gal/Ft. (2 in.), ___ .65 Gal/Ft. (4 in.), ___ 1.5 Gal/Ft. (6 in.), ___ Gal/Ft. (___ in.)) = [1.32 Gal/Vol; 5 Total Gal Purged]

Well Integrity: Yes / No
Prot. Casing Secure: ✓ / ___
Concrete Collar Intact: ✓ / ___
Other: ___ / ___

Equipment Documentation

Purging/Sampling Equipment Used:

(✓ If Used For) Purging	Sampling		Equipment ID
✓	✓	Peristaltic Pump	
—	—	Submersible Pump	
—	—	Bailer	
—	—	PVC/Silicon Tubing	
✓	✓	Teflon/Silicon Tubing	
—	—	Airlift	
—	—	Hand Pump	
—	—	In-line Filter	
—	—	Press/Vac Filter	
—	—		

Decontamination Fluids Used: (✓ All That Apply at Location)
___ Methanol (100%)
___ 25% Methanol/75% ASTM Type II water
✓ Deionized Water
___ Liquinox Solution
___ Hexane
___ HNO_3/D.I. Water Solution
___ Potable Water
___ None
___ ___
___ ___

Field Analysis Data

Ambient Air VOC ___ ppm Well Mouth ___ ppm Field Data Collected ___ In-line ___ In Container
Sample Observations: ___ Turbid ___ Colored ___ Clear ___ Odor ✓ Cloudy

Purge Data	@ 1 Gal.	@ 2.5 Gal.	@ 3 Gal.	@ 4 Gal.	@ ___ Gal.
Temperature, Deg. C	28.1	26.2	25.7	26.2	
pH, units	6.41	6.40	6.36	6.40	
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	204	181	180	172	
Oxidation - Reduction, +/- mv					
~~Dissolved Oxygen, ppm~~ Turbidity (NTU)	46.1	49.4	49.5	55.2	

Sample Collection Requirements (✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA	___	HCL	2x40 mL	✓	13600502 / ___ / ___
SVOA	___	4°C		___	___ / ___ / ___
Pest/PCB	___	4°C		___	___ / ___ / ___
Inorganics	___	HNO_3	1 Liter	✓	13600502 / ___ / ___
Explosives	___	4°C		___	___ / ___ / ___
TPH	___	H_2SO_4		___	___ / ___ / ___
TOC	___	H_2SO_4		___	___ / ___ / ___
Nitrate	___	H_2SO_4		___	___ / ___ / ___

Notes: 5 gallons purged

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 09545.54
Sample Location ID: OLD-13-06
Time: Start: 13:12 End: 13:50
Point of Interest: OU4
Date: 3/24/97
Signature of Sampler:

Water Level/Well Data

Well Depth 57 Ft. — ___ Measured / ✓ Historical
✓ Top of Well / ___ Top of Protective Casing
Well Riser Stick-up (from ground) 0 Ft.
Protective Casing/Well Difference ___ Ft.
Protective Casing ___ Ft.

Depth to Water 6.65 Ft.
Well Material: ✓ PVC / ___ SS
Well Locked?: ✓ Yes / ___ No
Well Dia. ✓ 2 inch / ___ 4 inch / ___ 6 inch
Water Level Equip. Used: ✓ Elect. Cond. Probe / ___ Float Activated / ___ Press. Transducer

Height of Water Column 50.35 Ft. X ✓ .16 Gal/Ft. (2 in.) / ___ .65 Gal/Ft. (4 in.) / ___ 1.5 Gal/Ft. (6 in.) / ___ ___ Gal/Ft. (___ in.) = 8.06 Gal/Vol
11 Total Gal Purged

Well Integrity: Yes / No
Prot. Casing Secure: ✓ / ___
Concrete Collar Intact: ✓ / ___
Other: ___ / ___

Equipment Documentation

Purging/Sampling Equipment Used :

(✓ If Used For) Purging	Sampling		Equipment ID
✓	✓	Peristaltic Pump	
—	—	Submersible Pump	
—	—	Bailer	
—	—	PVC/Silicon Tubing	
✓	✓	Teflon/Silicon Tubing	
—	—	Airlift	
—	—	Hand Pump	
—	—	In-line Filter	
—	—	Press/Vac Filter	
—	—		

Decontamination Fluids Used :

(✓ All That Apply at Location)
___ Methanol (100%)
___ 25% Methanol/75% ASTM Type II water
✓ Deionized Water
___ Liquinox Solution
___ Hexane
___ HNO_3/D.I. Water Solution
___ Potable Water
___ None

Field Analysis Data

Ambient Air VOC ___ ppm Well Mouth ___ ppm Field Data Collected ___ In-line / ___ In Container
Sample Observations: ___ Turbid / ✓ Clear / ___ Cloudy / ___ Colored / ___ Odor

Purge Data	@ 4 Gal.	@ 6 Gal.	@ 9 Gal.	@ ___ Gal.	@ ___ Gal.
Temperature, Deg. C	28.6	26.4	26.3		
pH, units	5.19	5.12	5.11		
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	125	121	122		
Oxidation - Reduction, +/- mv					
Dissolved Oxygen, ppm	2.76	3.66	3.59		
Turbidity (N.T.U)					

Sample Collection Requirements

(✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA	___	HCL	6x40mL	✓	13600602, 13600602MS, 13600602MSD
SVOA	___	4°C		___	
Pest/PCB	___	4°C		___	
Inorganics	___	HNO_3	3x1Liter	✓	13600602, 13600602MS, 13600602MSD
Explosives	___	4°C		___	
TPH	___	H_2SO_4		___	
TOC	___	H_2SO_4		___	
Nitrate	___	H_2SO_4		___	

Notes: 11 gallons purged

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 08545.54
Sample Location ID: OLD-13-07
Time: Start: 09:24 End: 09:55

Point of Interest: OU4
Date: 3/25/97
Signature of Sampler:

Water Level/Well Data

Well Depth 16.5 Ft. — ___ Measured / ✓ Historical — ✓ Top of Well / ___ Top of Protective Casing — Well Riser Stick-up 0 Ft. (from ground) — Protective ___ Ft. Casing/Well Difference — Protective ___ Ft. Casing

Depth to Water 5.54 Ft. — Well Material: ✓ PVC / ___ SS — Well Locked?: ✓ Yes / ___ No — Well Dia. ✓ 2 inch / ___ 4 inch / ___ 6 inch — Water Level Equip. Used: ✓ Elect. Cond. Probe / ___ Float Activated / ___ Press. Transducer

Height of Water Column 10.96 Ft. X ✓ .16 Gal/Ft. (2 in.) / ___ .65 Gal/Ft. (4 in.) / ___ 1.5 Gal/Ft. (6 in.) / ___ ___ Gal/Ft. (___ in.) = 1.75 Gal/Vol; 7.5 Total Gal Purged

Well Integrity:

	Yes	No
Prot. Casing Secure	✓	
Concrete Collar Intact	✓	
Other		

Equipment Documentation

Purging/Sampling Equipment Used :

(✓ If Used For) Purging	Sampling		Equipment ID
✓	✓	Peristaltic Pump	
		Submersible Pump	
		Bailer	
		PVC/Silicon Tubing	
✓	✓	Teflon/Silicon Tubing	
		Airlift	
		Hand Pump	
		In-line Filter	
		Press/Vac Filter	

Decontamination Fluids Used :

(✓ All That Apply at Location)
- ___ Methanol (100%)
- ___ 25% Methanol/75% ASTM Type II water
- ✓ Deionized Water
- ___ Liquinox Solution
- ___ Hexane
- ___ HNO_3/D.I. Water Solution
- ___ Potable Water
- ___ None

Field Analysis Data

Ambient Air VOC ___ ppm Well Mouth ___ ppm Field Data Collected ___ In-line / ✓ In Container

Sample Observations: ___ Turbid / ✓ Clear / ___ Cloudy / ___ Colored / ___ Odor

Purge Data	@ 2.5 Gal.	@ 5 Gal.	@ 6 Gal.	@ 6.5 Gal.	@ ___ Gal.
Temperature, Deg. C	24.9	24.6	24.3	24.6	
pH, units	6.17	6.12	6.16	6.21	
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	323	358	364	369	
Oxidation - Reduction, +/- mv					
Dissolved Oxygen, ppm	14.63	6.22	4.92	5.33	
Turbidity (NTU)					

Sample Collection Requirements (✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA		HCL	2x40mL	✓	13600702
SVOA		4°C			
Pest/PCB		4°C			
Inorganics		HNO_3	1 Liter	✓	13600703
Explosives		4°C			
TPH		H_2SO_4			
TOC		H_2SO_4			
Nitrate		H_2SO_4			

Notes: 7.5 gallons purged

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 09545.59
Sample Location ID: OLD-13-08
Time: Start: 09:25 End: 10:15
Point of Interest: OU4
Date: 3/25/97
Signature of Sampler: [signature]

Water Level/Well Data

Well Depth 62 Ft. — ___ Measured, ✓ Historical
✓ Top of Well, ___ Top of Protective Casing ___ ___
Well Riser Stick-up (from ground) 0 Ft.
Protective Casing/Well Difference ___ Ft.
Protective Casing ___ Ft.

Depth to Water 5.58 Ft.
Well Material: ✓ PVC, ___ SS, ___
Well Locked?: ✓ Yes, ___ No
Well Dia. ✓ 2 inch, ___ 4 inch, ___ 6 inch, ___ ___
Water Level Equip. Used: ✓ Elect. Cond. Probe, ___ Float Activated, ___ Press. Transducer, ___ ___

Height of Water Column 56.42 Ft. X ✓ .16 Gal/Ft. (2 in.), ___ .65 Gal/Ft. (4 in.), ___ 1.5 Gal/Ft. (6 in.), ___ ___ Gal/Ft. (___ in.) = 9.03 Gal/Vol; 14 Total Gal Purged

Well Integrity:

	Yes	No
Prot. Casing Secure	✓	
Concrete Collar Intact	✓	
Other		

Equipment Documentation

Purging/Sampling Equipment Used :

(✓ If Used For) Purging	Sampling		Equipment ID
✓	✓	Peristaltic Pump	
		Submersible Pump	
		Bailer	
		PVC/Silicon Tubing	
✓	✓	Teflon/Silicon Tubing	
		Airlift	
		Hand Pump	
		In-line Filter	
		Press/Vac Filter	

Decontamination Fluids Used :

(✓ All That Apply at Location)
___ Methanol (100%)
___ 25% Methanol/75% ASTM Type II water
✓ Deionized Water
___ Liquinox Solution
___ Hexane
___ HNO_3/D.I. Water Solution
___ Potable Water
___ None
___ ___
___ ___

Field Analysis Data

Ambient Air VOC ___ ppm Well Mouth ___ ppm Field Data Collected ___ In-line, ✓ In Container

Sample Observations: ___ Turbid, ✓ Colored, ___ Clear, ___ Odor, ___ Cloudy

Purge Data	@ 4 Gal.	@ 8 Gal.	@ 10 Gal.	@ 11 Gal.	@ 13 Gal.
Temperature, Deg. C	25.8	25.8	25.3	25.1	25.3
pH, units	5.41	5.30	5.23	5.22	5.13
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	123	129	129	128	130
Oxidation - Reduction, +/- mv					
Dissolved Oxygen, ppm	22.1	20.6	14.86	13.93	11.84
Turbidity (NTU's)					

Sample Collection Requirements

(✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA	___	HCL	2x40 ml	✓	13600802 / ___ / ___
SVOA	___	4°C		___	___ / ___ / ___ / ___
Pest/PCB	___	4°C		___	___ / ___ / ___ / ___
Inorganics	___	HNO_3	1 Liter	___	13600502 / ___ / ___ / ___
Explosives	___	4°C		___	___ / ___ / ___ / ___
TPH	___	H_2SO_4		___	___ / ___ / ___ / ___
TOC	___	H_2SO_4		___	___ / ___ / ___ / ___
Nitrate	___	H_2SO_4		___	___ / ___ / ___ / ___

Notes: 14 gallons purged

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 08545.54
Sample Location ID: OLD-13-18 (Macewell)
Time: Start: 11:22 End: _____

Point of Interest: OU1
Date: 3/25/97
Signature of Sampler: [signature]

Water Level/Well Data

Well Depth 30.62 Ft. — ✓ Measured / ___ Historical

✓ Top of Well / ___ Top of Protective Casing

Well Riser Stick-up 0 Ft. (from ground)

Protective _____ Ft. Casing/Well Difference

Protective _____ Ft. Casing

Depth to Water 8.99 Ft.

Well Material: ✓ PVC / ___ SS / _____

Well Locked?: ✓ Yes / ___ No

Well Dia. ___ 2 inch / ___ 4 inch / ___ 6 inch / ✓ 0.5 in

Water Level Equip. Used: ✓ Elect. Cond. Probe / ___ Float Activated / ___ Press. Transducer / ___ _____

Height of Water Column 21.68 Ft. X ___ .16 Gal/Ft. (2 in.) / ___ .65 Gal/Ft. (4 in.) / ___ 1.5 Gal/Ft. (6 in.) / ___ ___ Gal/Ft. (___ in.) = _____ Gal/Vol

6.5 Total Gal Purged

Well Integrity: Yes / No
Prot. Casing Secure: ✓ / ___
Concrete Collar Intact: ✓ / ___
Other _____ ___ / ___

Equipment Documentation

Purging/Sampling Equipment Used :

(✓ If Used For) Purging	Sampling		Equipment ID
✓	✓	Peristaltic Pump	
—	—	Submersible Pump	
—	—	Bailer	
—	—	PVC/Silicon Tubing	
✓	✓	Teflon/Silicon Tubing	
—	—	Airlift	
—	—	Hand Pump	
—	—	In-line Filter	
—	—	Press/Vac Filter	
—	—		

Decontamination Fluids Used :

(✓ All That Apply at Location)
___ Methanol (100%)
___ 25% Methanol/75% ASTM Type II water
✓ Deionized Water
___ Liquinox Solution
___ Hexane
___ HNO_3/D.I. Water Solution
___ Potable Water
___ None
___ _____
___ _____

Field Analysis Data

Ambient Air VOC _____ ppm Well Mouth _____ ppm Field Data Collected ___ In-line / ✓ In Container

Sample Observations: ___ Turbid / ✓ Colored ___ Clear / ✓ Odor ___ Cloudy

Purge Data	@ 0.5 Gal.	@ 2.5 Gal.	@ 5 Gal.	@ 6 Gal.	@ 6.5 Gal.
Temperature, Deg. C	25.6	24.1	24.2	23.8	23.7
pH, units	5.36	5.31	5.32	5.25	5.36
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	105	93	91	90	90
Oxidation - Reduction, +/- mv					
~~Dissolved Oxygen, ppm~~ Turbidity (NTU)	>200	91.7	23.4	21.2	15.4

Sample Collection Requirements

(✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA	___	HCL	4 x 40 ml	✓	~~136C / SO1~~, ~~136C / SO1 D~~ JMW
SVOA	___	4°C		___	V16C / SO1, V16C / SO1 D
Pest/PCB	___	4°C		___	___ / ___ / ___ / ___
Inorganics	___	HNO_3		___	___ / ___ / ___ / ___
Explosives	___	4°C		___	___ / ___ / ___ / ___
TPH	___	H_2SO_4		___	___ / ___ / ___ / ___
TOC	___	H_2SO_4		___	___ / ___ / ___ / ___
Nitrate	___	H_2SO_4		___	___ / ___ / ___ / ___

Notes: _____

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 08545.59
Sample Location ID: OLD-13-19 (Maxwell)
Time: Start: 14:09 End: 15:05
Point of Interest: OU4
Date: 3/25/99
Signature of Sampler:

Water Level/Well Data

Well Depth 20.53 Ft. ✓ Measured ___ Historical
✓ Top of Well ___ Top of Protective Casing ___ ___
Well Riser Stick-up (from ground) 0 Ft.
Protective Casing/Well Difference ___ Ft.
Protective Casing ___ Ft.

Depth to Water 9.00 Ft.
Well Material: ✓ PVC ___ SS ___
Well Locked?: ✓ Yes ___ No
Well Dia. ___ 2 inch ___ 4 inch ___ 6 inch ✓ 0.5 in
Water Level Equip. Used: ✓ Elect. Cond. Probe ___ Float Activated ___ Press. Transducer ___ ___

Height of Water Column 11.53 Ft. X ___.16 Gal/Ft. (2 in.) ___.65 Gal/Ft. (4 in.) ___1.5 Gal/Ft. (6 in.) ___ ___ Gal/Ft. (___in.) = [___ Gal/Vol ; 8 Total Gal Purged]

Well Integrity:	Yes	No
Prot. Casing Secure	✓	
Concrete Collar Intact	✓	
Other		

Equipment Documentation

Purging/Sampling Equipment Used :

(✓ If Used For) Purging	Sampling		Equipment ID
✓	✓	Peristaltic Pump	
		Submersible Pump	
		Bailer	
		PVC/Silicon Tubing	
✓	✓	Teflon/Silicon Tubing	
		Airlift	
		Hand Pump	
		In-line Filter	
		Press/Vac Filter	

Decontamination Fluids Used :

(✓ All That Apply at Location)
___ Methanol (100%)
___ 25% Methanol/75% ASTM Type II water
✓ Deionized Water
___ Liquinox Solution
___ Hexane
___ HNO_3/D.I. Water Solution
___ Potable Water
___ None
___ ___
___ ___

Field Analysis Data

Ambient Air VOC ___ ppm Well Mouth ___ ppm Field Data Collected ___ In-line ✓ In Container
Sample Observations: ✓ Turbid ___ Colored ___ Clear ✓ Odor ___ Cloudy

Purge Data	@ 2 Gal.	@ 5 Gal.	@ 6 Gal.	@ 7 Gal.	@ 25 Gal.
Temperature, Deg. C	23.5	23.4	23.2	23.2	23.4
pH, units	5.91	5.55	5.50	5.51	5.51
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	242	243	242	247	246
Oxidation - Reduction, +/- mv					
~~Dissolved Oxygen, ppm~~ Turbidity (NTU)	>200	>200	>200	>200	>200

Sample Collection Requirements (✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA	___	HCL	2x40mL	✓	~~1360~~ ~~1361~~ / VMW / ___
SVOA	___	4OC		___	~~1760~~ 1901 / ___ / ___
Pest/PCB	___	4OC		___	___ / ___ / ___ / ___
Inorganics	___	HNO_3		___	___ / ___ / ___ / ___
Explosives	___	4°C		___	___ / ___ / ___ / ___
TPH	___	H_2SO_4		___	___ / ___ / ___ / ___
TOC	___	H_2SO_4		___	___ / ___ / ___ / ___
Nitrate	___	H_2SO_4		___	___ / ___ / ___ / ___

Notes: ___

GROUNDWATER SAMPLE FIELD DATA

Project: BRAC NTC Orlando
Project Number: 08345.59
Sample Location ID: OLD-13-20 (Mirowell)
Time: Start: 11:35 End: 14:35
Point of Interest: OU4
Date: 3/25/92
Signature of Sampler:

Water Level/Well Data

Well Depth 19.58 Ft. ✓ Measured ___ Historical
✓ Top of Well ___ Top of Protective Casing ___ ___
Well Riser Stick-up (from ground) 0 Ft.
Protective Casing/Well Difference ___ Ft.
Protective Casing ___ Ft.

Depth to Water 2.98 Ft.
Well Material: ✓ PVC ___ SS ___
Well Locked?: ✓ Yes ___ No
Well Dia. ___ 2 inch ___ 4 inch ___ 6 inch ✓ 12.5 in
Water Level Equip. Used: ✓ Elect. Cond. Probe ___ Float Activated ___ Press. Transducer ___ ___

Height of Water Column 11.6 Ft. X ___ .16 Gal/Ft. (2 in.) ___ .65 Gal/Ft. (4 in.) ___ 1.5 Gal/Ft. (6 in.) ___ ___ Gal/Ft. (___ in.) = [___ Gal/Vol ; 8 Total Gal Purged]

Well Integrity: Yes / No
Prot. Casing Secure: ✓ / ___
Concrete Collar Intact: ✓ / ___
Other ___ / ___

Equipment Documentation

Purging/Sampling Equipment Used :

(✓ If Used For) Purging	Sampling		Equipment ID
✓	✓	Peristaltic Pump	
—	—	Submersible Pump	
—	—	Bailer	
—	—	PVC/Silicon Tubing	
✓	✓	Teflon/Silicon Tubing	
—	—	Airlift	
—	—	Hand Pump	
—	—	In-line Filter	
—	—	Press/Vac Filter	
—	—		

Decontamination Fluids Used :

(✓ All That Apply at Location)
___ Methanol (100%)
___ 25% Methanol/75% ASTM Type II water
✓ Deionized Water
___ Liquinox Solution
___ Hexane
___ HNO_3/D.I. Water Solution
___ Potable Water
___ None
___ ___
___ ___

Field Analysis Data

Ambient Air VOC ___ ppm Well Mouth ___ ppm Field Data Collected ___ In-line ✓ In Container
Sample Observations: ✓ Turbid ___ Clear ___ Cloudy ___ Colored ✓ Odor

Purge Data	@ 1 Gal.	@ 4 Gal.	@ 5 Gal.	@ 6 Gal.	@ 25 Gal.
Temperature, Deg. C	23.2	23.2	23.8	23.3	23.2
pH, units	5.80	5.50	5.54	5.24	5.28
Specific Conductivity (umhos/cm. @ 25 Deg. C.)	132	132	134	133	132
Oxidation - Reduction, +/- mv					
~~Dissolved Oxygen, ppm~~ Turbidity (NTU)	>200	>200	>200	>200	>200

Sample Collection Requirements

(✓ If Required at this Location)

Analytical Parameter	✓ If Field Filtered	Preservation Method	Volume Required	✓ If Sample Collected	Sample Bottle IDs
VOA	___	HCL	2 x 40 mL	✓	~~T360200~~ JMN / ___
SVOA	___	4°C		___	U4C0200 / ___
Pest/PCB	___	4°C		___	___ / ___
Inorganics	___	HNO_3		___	___ / ___
Explosives	___	4°C		___	___ / ___
TPH	___	H_2SO_4		___	___ / ___
TOC	___	H_2SO_4		___	___ / ___
Nitrate	___	H_2SO_4		___	___ / ___

Notes: ___

APPENDIX C

LABORATORY STATISTICAL COMPARISON

TABLE C-1
Appendix C. Comparison of Analytical Results Between Onsite and Offsite Groundwater Samples

Interim Remedial Action, Operable Unit 4
Focused Investigation/Source Confirmation, Building 1100 Surge Tank
Naval Training Center
Orlando, FL

Location ID	U4Q015					U4Q015					U4Q016					U4Q021				
Sample ID	U4Q01501		U4Q01501			U4Q01502		U4Q01502			U4Q01601		U4Q01601			U4Q02101		U4Q02101		
Sampling Date	11-Mar-97					11-Mar-97					11-Mar-97					14-Mar-97				
cis-1,2-Dichloroethene	300	U	8		D= 292	250	U	50		D= 200	3		2		D= 1	1.1		10		D= 8.9
trans-1,2-Dichloroethene	300	U	2	U	NC	250	U	5		D= 245	1	U	2	U	NC	0.5	U	2	U	NC
Tetrachloroethene	**14000**		**800**	E	**RPD= 178**	**6100**		**550**	E	**RPD= 167**	**38**		**270**	E	**RPD= 151**	**1.4**		**25**		**D= 24**
Trichloroethene	440		200	E	D= 240	**11000**		**640**	E	**RPD= 178**	**3.9**		**15**		**D= 11**	0.58		2	U	D= 1
Toluene	300	U	2	U	NC	250	U	6		D= 244	1	U	2	U	NC	0.5	U	2	U	NC

Location ID	U4Q021					U4Q024					U4Q025					U4Q027				
Sample ID	U4Q02102		U4Q02102			U4Q02403		U4Q02403			U4Q02505		U4Q02505			U4Q02704		U4Q02704		
Sampling Date	14-Mar-97					15-Mar-97					16-Mar-97					16-Mar-97				
cis-1,2-Dichloroethene	0.9		6		D= 5.1	**880**		**450**	E	**RPD= 66**	0.99		2	U	D= 1.0	0.13	J	2	U	D= 1.9
trans-1,2-Dichloroethene	0.5	U	2	U	NC	**12**	**U**	**30**		D= 18	0.5	U	3		D= 2.5	0.5	U	3		D= 2.5
Tetrachloroethene	1.1		8		D= 7	**33**		**50**		**RPD= 41**	**33**		**6**		**D= 27**	0.5	U	2	U	NC
Trichloroethene	0.22	J	2	U	D= 1.8	**90**		**170**	E	**RPD= 62**	**90**		**2**	**U**	**D= 88**	0.5	U	2	U	NC
Toluene	0.5	U	2	U	NC	12	U	2	U	NC	0.5	U	2	U	NC	0.5	U	2	U	NC

NOTES:

Sample identifiers ending in F (.e.g, U4Q01501F) are split samples analyzed in the onsite laboratory; those with no F designation are analyzed in the offsite laboratory.
Analytical results expressed in micrograms per liter (ug/L).
U= Compound was not detected at the sample quantitation limit (SQL). The number preceding the U qualifier is the SQL.
J = Reported concentration is an estimated quantity.
E= Reported concentration for the onsite sample exceeds the calibration range for that compound.
The onsite sample was not reanalyzed at a secondary dilution because it is only a screening concentration.
Sample U4Q01501 and U4Q01502 were analyzed at a secondary dilution factor of 300 and 250, respectively.
RPD = Relative percent difference.
D = Absolute difference.
NC = Not calculated since the compound was not detected in both onsite and offsite sample.
Bolded entries indicate out of control parameter pairs based on the RPD or |D| criteria.

TABLE C-2

Appendix C. Comparison of Analytical Results Between Onsite and Offsite Soil Samples

Interim Remedial Action, Operable Unit 4
Focused Investigation/Source Confirmation, Building 1100 Surge Tank
Naval Training Center
Orlando, FL

Location ID	U4P015					U4P015					U4P025				
Sample ID	U4P01501		U4P01501F			U4P01505		U4P01505F			U4P02501		U4P02501F		
Sampling Date	11-Mar-97					11-Mar-97					15-Mar-97				
Tetrachloroethene	**430**		**15**		**RPD= 187**	**7.6**		**2**	**U**	**D= 6**	**17**		**60**		**D= 43**
Trichloroethene	**7.6**	**J**	**2**	**U**	**D= 5.6**	**27**		**3**		**D= 24**	5.2	U	2	U	NC

NOTES:

Sample identifiers ending in F (.e.g, U4P01501F) are split samples analyzed in the onsite laboratory; those with no F designation are analyzed offsite.
Analytical results expressed in micrograms per kilograms (ug/kg).
U= Compound was not detected at the sample quantitation limit (SQL). The number preceding the U qualifier is the SQL.
J = Reported concentration is an estimated quantity.
RPD = Relative percent difference.
D = Absolute difference.
NC = Not calculated since the compound was not detected in both onsite and offsite sample.
Bolded entries indicate out of control parameter pairs based on the RPD or |D| criteria.

APPENDIX D

ONSITE LABORATORY ANALYTICAL RESULTS, TERRAPROBE℠ SOIL AND GROUNDWATER SAMPLING

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4Q01401F		U4P01401FD		U4Q01402F		U4P01402FD		U4Q01402FD		U4Q01403F		U4Q01404F		U4P01401F		U4P01402F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	6		<2	U	5		7		15		<2	U	<2	U
c-1,2-Dichloroethene	45		<2	U	250	E	<2	U	240	E	200	E	300	E	<2	U	<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	230	E	<2	U	400	E	<2	U	440	E	500	E	200	E	<2	U	<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	440	E	133	E	50		15		20		45		30		82		12	
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4P01403F		U4P01404F		U4P01405F		U4P01406F		U4Q01501F		U4Q01502F		U4Q01503F		U4P01501F		U4P01502F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	5		5		<2	U	<2	U
c-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	8		50		30		<2	U	<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	2		200	E	640	E	1000	E	<2	U	<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	6		<2	U	<2	U	<2	U
Tetrachloroethene	4		<2	U	<2	U	<2	U	800	E	550	E	3362	E	52		15	
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	12		<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4P01503F		U4P01504F		U4P01505F		U4Q01601F		U4Q01602F		U4Q01603F		U4Q01604F		U4Q01605F		U4P01601F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
c-1,2-Dichloroethene	<2	U	<2	U	<2	U	2		<2	U	3		<2	U	<2	U	<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	3		15		4		<2	U	<2	U	<2	U	3	
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	12		15		<2	U	270	E	60		120	E	50		600	E	158	E
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4P01602F		U4P01603F		U4P01604F		U4P01605F		U4P01606F		U4P01607F		U4Q01701F		U4Q01702F		U4Q01703F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
c-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	7		4		<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	8		5		<2	U	<2	U	<2	U	<2	U	5		10		12	
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4Q01704F		U4Q01705F		U4Q01705FD		U4P01701F		U4P01702F		U4P01703F		U4P01704F		U4P01705F		U4P01706F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
c-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	11		17		10		100		10		6		<2	U	<2	U	<2	U
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4P01707F		U4Q01801F		U4P01801F		U4P01802F		U4P01803F		U4Q02001F		U4Q02002F		U4Q02003F		U4Q02003FD	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	3		<2	U	<2	U	<2	U
c-1,2-Dichloroethene	<2	U	5		<2	U	<2	U	<2	U	140	E	60		65		60	
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	260	E	25		100		105	E
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	<2	U	7		4		<2	U	<2	U	400	E	1000	E	2350	E	2370	E
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4Q02004F		U4Q02005F		U4P02001F		U4P02001FD		U4P02002F		U4P02003F		U4P02004F		U4P02005F		U4P02006F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
c-1,2-Dichloroethene	30		20		<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	20		4		<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	2000	E	600	E	250	E	260	E	40		20		<2	U	4		5	
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4P02007F		U4Q02101F		U4Q02102F		U4Q02102FD		U4Q02301F		U4Q02302F		U4Q02303F		U4P02301F		U4P02302F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
c-1,2-Dichloroethene	<2	U	10		6		6		<2	U	<2	U	<2	U	<2	U	<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	<2	U	25		8		9		<2	U	<2	U	10		<2	U	<2	U
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4P02303F		U4P02304F		U4P02305F		U4P02306F		U4Q02401F		U4Q02402F		U4Q02403F		U4Q02403FD		U4Q02404F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	4		30		30		8	
c-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	20		70		450	E	700	E	200	E
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	5		170	E	90		<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	7		50		40		150	E
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4Q02405F		U4P02401F		U4P02401FD		U4P02402F		U4P02403F		U4P02404F		U4P02405F		U4P02406F		U4P02407F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
c-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	<2	U	15		15		<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4Q02501F		U4Q02502F		U4Q02503F		U4Q02504F		U4Q02505F		U4P02501F		U4P02502F		U4P02503F		U4P02504F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	6		3		<2	U	<2	U	<2	U	<2	U
c-1,2-Dichloroethene	<2	U	<2	U	3		112	E	<2	U	<2	U	<2	U	<2	U	<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	13		<2	U	<2	U	<2	U	<2	U	<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	<2	U	<2	U	<2	U	98		6		60		6		<2	U	<2	U
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4P02505F		U4P02506F		U4P02507F		U4Q02601F		U4Q02602F		U4Q02602FD		U4Q02603F		U4Q02604F		U4Q02605F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	2		<2	U	<2	U	<2	U	<2	U	<2	U
c-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	11		11		14		40		3	
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	2		<2	U	30		100	
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	<2	U	<2	U	<2	U	320	E	84		66		110	E	2100	E	1100	E
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4P02601F		U4P02602F		U4P02603F		U4P02604F		U4P02605F		U4Q02701F		U4Q02702F		U4Q02703F		U4Q02704F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	6		2		5		3	
c-1,2-Dichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	5		4		<2	U
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	9		<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	4		<2	U	<2	U	<2	U	<2	U	<2	U	<2	U

OU4 - FOCUSED SURGE TANK INVESTIGATION
ON-SITE FIELD LABORATORY DATA

Naval Training Center
Orlando, Florida

SAMPLE ID	U4Q02705F		U4Q02801F		U4Q02802F		U4Q02803F		U4Q02804F	
1,1-Dichloroethene	<4	U	<4	U	<4	U	<4	U	<4	U
t-1,2-Dichloroethene	<2	U	2		<2	U	<2	U	2	
c-1,2-Dichloroethene	<2	U	11		12		3		<2	U
Benzene	<2	U	<2	U	<2	U	<2	U	<2	U
Trichloroethene	<2	U	<2	U	<2	U	<2	U	<2	U
Toluene	<2	U	<2	U	<2	U	<2	U	<2	U
Tetrachloroethene	2		<2	U	3		3		5	
Ethylbenzene	<2	U	<2	U	<2	U	<2	U	<2	U
m/p-Xylene	<4	U	<4	U	<4	U	<4	U	<4	U
o-Xylene	<2	U	<2	U	<2	U	<2	U	<2	U

APPENDIX E

OFFSITE LABORATORY ANALYTICAL RESULTS, TERRAPROBE℠ SOIL AND GROUNDWATER SAMPLING

Appendix E. Summary of DPT Soil Analytical Results
Operable Unit 4

OU4 Interim Remedial Action
Naval Training Center, Orlando
Orlando, FL

Sample ID	U4P01504		U4P01505		U4P01505D		U4P01604		U4P01901		U4P01902		U4P01903		U4P01904	
Lab ID	C7C120156001		C7C120156002		C7C120156003		C7C120156009		C7C140128003		C7C140128004		C7C140128005		C7C140128006	
Sampling Date	11-Mar-97		11-Mar-97		11-Mar-97		11-Mar-97		13-Mar-97		13-Mar-97		13-Mar-97		13-Mar-97	
Volatile Organics, ug/kg																
1,1,1-Trichloroethane	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
1,1,2,2-Tetrachloroethane	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
1,1,2-Trichloroethane	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
1,1-Dichloroethane	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
1,1-Dichloroethene	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
1,2-Dichloroethane	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
1,2-Dichloroethene (total)	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
1,2-Dichloropropane	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
2-Butanone	230	U	120	U	120	U	120	U	100	U	100	U	120	U	120	U
2-Hexanone	120	U	60	U	59	U	60	U	52	U	51	U	60	U	62	U
4-Methyl-2-pentanone	120	U	60	U	59	U	60	U	52	U	51	U	60	U	62	U
Acetone	230	U	120	U	120	U	120	U	100	U	100	U	120	U	120	U
Benzene	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Bromodichloromethane	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Bromoform	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Bromomethane	23	U	12	U	12	U	12	U	10	U	10	U	12	U	12	U
Carbon disulfide	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Carbon tetrachloride	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Chlorobenzene	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Chloroethane	23	U	12	U	12	U	12	U	10	U	10	U	12	U	12	U
Chloroform	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Chloromethane	23	U	12	U	12	U	12	U	10	U	10	U	12	U	12	U
cis-1,3-Dichloropropene	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Dibromochloromethane	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Ethylbenzene	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Methylene chloride	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Styrene	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Tetrachloroethene	430		7.6		26		6	U	41		22		6	U	6.2	U
Toluene	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
trans-1,3-Dichloropropene	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U
Trichloroethene	7.6	J	27		27		6	U	5.2	U	5.1	U	6	U	6.2	U
Vinyl chloride	23	U	12	U	12	U	12	U	10	U	10	U	12	U	12	U
Xylenes (total)	12	U	6	U	5.9	U	6	U	5.2	U	5.1	U	6	U	6.2	U

Appendix E. Summary of DPT Soil Analytical Results
Operable Unit 4

OU4 Interim Remedial Action
Naval Training Center, Orlando
Orlando, FL

Sample ID	U4P01905		U4P02004		U4P02101		U4P02102		U4P02103		U4P02104		U4P02301		U4P02301D	
Lab ID	C7C140128007		C7C140128008		C7C170103004		C7C170103005		C7C170103006		C7C170103007		C7C180112001		C7C180112002	
Sampling Date	13-Mar-97		13-Mar-97		14-Mar-97		14-Mar-97		14-Mar-97		14-Mar-97		15-Mar-97		15-Mar-97	
Volatile Organics, ug/kg																
1,1,1-Trichloroethane	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
1,1,2,2-Tetrachloroethane	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
1,1,2-Trichloroethane	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
1,1-Dichloroethane	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
1,1-Dichloroethene	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
1,2-Dichloroethane	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
1,2-Dichloroethene (total)	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
1,2-Dichloropropane	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
2-Butanone	120	U	120	U	100	U	100	U	120	U	130	U	100	U	100	U
2-Hexanone	61	U	61	U	51	U	52	U	60	U	64	U	51	U	51	U
4-Methyl-2-pentanone	61	U	61	U	51	U	52	U	60	U	64	U	51	U	51	U
Acetone	120	U	120	U	100	U	100	U	120	U	130	U	100	U	100	U
Benzene	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Bromodichloromethane	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Bromoform	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Bromomethane	12	U	12	U	10	U	10	U	12	U	13	U	10	U	10	U
Carbon disulfide	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Carbon tetrachloride	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Chlorobenzene	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Chloroethane	12	U	12	U	10	U	10	U	12	U	13	U	10	U	10	U
Chloroform	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Chloromethane	12	U	12	U	10	U	10	U	12	U	13	U	10	U	10	U
cis-1,3-Dichloropropene	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Dibromochloromethane	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Ethylbenzene	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Methylene chloride	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Styrene	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Tetrachloroethene	6.1	U	6.1	U	31		20		6	U	6.4	U	5.1	U	5.1	U
Toluene	6.1	U	6.1	U	5.1	U	2	J	6	U	6.4	U	5.1	U	5.1	U
trans-1,3-Dichloropropene	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Trichloroethene	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U
Vinyl chloride	12	U	12	U	10	U	10	U	12	U	13	U	10	U	10	U
Xylenes (total)	6.1	U	6.1	U	5.1	U	5.2	U	6	U	6.4	U	5.1	U	5.1	U

Appendix E. Summary of DPT Soil Analytical Results
Operable Unit 4

OU4 Interim Remedial Action
Naval Training Center, Orlando
Orlando, FL

Sample ID	U4P02501		U4P02501D		U4P02602	
Lab ID	C7C180112003		C7C180112004		C7C180112005	
Sampling Date	15-Mar-97		15-Mar-97		16-Mar-97	
Volatile Organics, ug/kg						
1,1,1-Trichloroethane	5.2	U	5.4	U	5.9	U
1,1,2,2-Tetrachloroethane	5.2	U	5.4	U	5.9	U
1,1,2-Trichloroethane	5.2	U	5.4	U	5.9	U
1,1-Dichloroethane	5.2	U	5.4	U	5.9	U
1,1-Dichloroethene	5.2	U	5.4	U	5.9	U
1,2-Dichloroethane	5.2	U	5.4	U	5.9	U
1,2-Dichloroethene (total)	5.2	U	5.4	U	5.9	U
1,2-Dichloropropane	5.2	U	5.4	U	5.9	U
2-Butanone	100	U	110	U	120	U
2-Hexanone	52	U	54	U	59	U
4-Methyl-2-pentanone	52	U	54	U	59	U
Acetone	100	U	110	U	120	U
Benzene	5.2	U	5.4	U	5.9	U
Bromodichloromethane	5.2	U	5.4	U	5.9	U
Bromoform	5.2	U	5.4	U	5.9	U
Bromomethane	10	U	11	U	12	U
Carbon disulfide	5.2	U	5.4	U	5.9	U
Carbon tetrachloride	5.2	U	5.4	U	5.9	U
Chlorobenzene	5.2	U	5.4	U	5.9	U
Chloroethane	10	U	11	U	12	U
Chloroform	5.2	U	5.4	U	5.9	U
Chloromethane	10	U	11	U	12	U
cis-1,3-Dichloropropene	5.2	U	5.4	U	5.9	U
Dibromochloromethane	5.2	U	5.4	U	5.9	U
Ethylbenzene	5.2	U	5.4	U	5.9	U
Methylene chloride	5.2	U	5.4	U	5.9	U
Styrene	5.2	U	5.4	U	5.9	U
Tetrachloroethene	17		21		5.9	U
Toluene	5.2	U	5.4	U	5.9	U
trans-1,3-Dichloropropene	5.2	U	5.4	U	5.9	U
Trichloroethene	5.2	U	5.4	U	5.9	U
Vinyl chloride	10	U	11	U	12	U
Xylenes (total)	5.2	U	5.4	U	5.9	U

Appendix E. Summary of DPT Groundwater Analytical Results
Operable Unit 4

OU4 Interim Remedial Action
Naval Training Center, Orlando
Orlando, FL

Sample ID	U4Q01501		U4Q01502		U4Q01502D		U4Q01601		U4Q01601		U4Q01901		U4Q01902		U4Q02101	
Lab ID	C7C120156004		C7C120156005		C7C120156006		C7C120156007		C7C120156007R		C7C140128009		C7C140128002		C7C170103002	
Sampling Date	11-Mar-97		11-Mar-97		11-Mar-97		11-Mar-97		11-Mar-97		13-Mar-97		13-Mar-97		14-Mar-97	
Volatile Organics, ug/L																
1,1,1,2-Tetrachloroethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,1,1-Trichloroethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,1-Dichloropropene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,2,3-Trichlorobenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,2,3-Trichloropropane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-chloropropa	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,3,5-Trimethylbenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,3-Dichloropropane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
2,2-Dichloropropane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
2-Chlorotoluene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
4-Chlorotoluene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Benzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Bromobenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Bromoform	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Bromomethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Carbon tetrachloride	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Chlorodibromomethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Chloroethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Chloroform	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U

Appendix E. Summary of DPT Groundwater Analytical Results
Operable Unit 4

OU4 Interim Remedial Action
Naval Training Center, Orlando
Orlando, FL

Sample ID	U4Q01501		U4Q01502		U4Q01502D		U4Q01601		U4Q01601		U4Q01901		U4Q01902		U4Q02101	
Lab ID	C7C120156004		C7C120156005		C7C120156006		C7C120156007		C7C120156007R		C7C140128009		C7C140128002		C7C170103002	
Sampling Date	11-Mar-97		11-Mar-97		11-Mar-97		11-Mar-97		11-Mar-97		13-Mar-97		13-Mar-97		14-Mar-97	
Volatile Organics, ug/L																
Chloromethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	300	U	250	U	300	U	3.3		3		0.5	U	0.5	U	1.1	
cis-1,3-Dichloropropene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Dibromomethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Dichlorodifluoromethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Hexachlorobutadiene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Isopropylbenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Methylene chloride	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
n-Butylbenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
n-Propylbenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Naphthalene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
p-Isopropyltoluene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
sec-Butylbenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Styrene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
tert-Butylbenzene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene	14000		6100		8600		42	E	38		5.4		2.4		1.4	
Toluene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Trichloroethene	440		11000		15000		4.4		3.9		0.24	J	0.12	J	0.58	
Trichlorofluoromethane	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Vinyl chloride	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U
Xylenes (total)	300	U	250	U	300	U	0.5	U	1	U	0.5	U	0.5	U	0.5	U

Appendix E. Summary of DPT Groundwater Analytical Results
Operable Unit 4

OU4 Interim Remedial Action
Naval Training Center, Orlando
Orlando, FL

Sample ID	U4Q02102		U4Q02403		U4Q02403D		U4Q02505		U4Q02704	
Lab ID	C7C170103003		C7C180112007		C7C180112008		C7C180112009		C7C180112010	
Sampling Date	14-Mar-97		15-Mar-97		15-Mar-97		16-Mar-97		16-Mar-97	
Volatile Organics, ug/L										
1,1,1,2-Tetrachloroethane	0.5	U	12	U	12	U	0.5	U	0.5	U
1,1,1-Trichloroethane	0.5	U	12	U	12	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U	12	U	12	U	0.5	U	0.5	U
1,1,2-Trichloroethane	0.5	U	12	U	12	U	0.5	U	0.5	U
1,1-Dichloroethane	0.5	U	12	U	12	U	0.5	U	0.5	U
1,1-Dichloroethene	0.5	U	12	U	12	U	0.5	U	0.5	U
1,1-Dichloropropene	0.5	U	12	U	12	U	0.5	U	0.5	U
1,2,3-Trichlorobenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
1,2,3-Trichloropropane	0.5	U	12	U	12	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
1,2-Dibromo-3-chloropropa	0.5	U	12	U	12	U	0.5	U	0.5	U
1,2-Dibromoethane	0.5	U	12	U	12	U	0.5	U	0.5	U
1,2-Dichlorobenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
1,2-Dichloroethane	0.5	U	12	U	12	U	0.5	U	0.5	U
1,2-Dichloropropane	0.5	U	12	U	12	U	0.5	U	0.5	U
1,3,5-Trimethylbenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
1,3-Dichlorobenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
1,3-Dichloropropane	0.5	U	12	U	12	U	0.5	U	0.5	U
1,4-Dichlorobenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
2,2-Dichloropropane	0.5	U	12	U	12	U	0.5	U	0.5	U
2-Chlorotoluene	0.5	U	12	U	12	U	0.5	U	0.5	U
4-Chlorotoluene	0.5	U	12	U	12	U	0.5	U	0.5	U
Benzene	0.5	U	12	U	12	U	0.5	U	0.5	U
Bromobenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
Bromochloromethane	0.5	U	12	U	12	U	0.5	U	0.5	U
Bromodichloromethane	0.5	U	12	U	12	U	0.5	U	0.5	U
Bromoform	0.5	U	12	U	12	U	0.5	U	0.5	U
Bromomethane	0.5	U	12	U	12	U	0.5	U	0.5	U
Carbon tetrachloride	0.5	U	12	U	12	U	0.5	U	0.5	U
Chlorobenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
Chlorodibromomethane	0.5	U	12	U	12	U	0.5	U	0.5	U
Chloroethane	0.5	U	12	U	12	U	0.5	U	0.5	U
Chloroform	0.5	U	12	U	12	U	0.5	U	0.5	U

Appendix E. Summary of DPT Groundwater Analytical Results
Operable Unit 4

OU4 Interim Remedial Action
Naval Training Center, Orlando
Orlando, FL

Sample ID	U4Q02102		U4Q02403		U4Q02403D		U4Q02505		U4Q02704	
Lab ID	C7C170103003		C7C180112007		C7C180112008		C7C180112009		C7C180112010	
Sampling Date	14-Mar-97		15-Mar-97		15-Mar-97		16-Mar-97		16-Mar-97	
Volatile Organics, ug/L										
Chloromethane	0.5	U	12	U	12	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	0.9		880		830		0.99		0.13	J
cis-1,3-Dichloropropene	0.5	U	12	U	12	U	0.5	U	0.5	U
Dibromomethane	0.5	U	12	U	12	U	0.5	U	0.5	U
Dichlorodifluoromethane	0.5	U	12	U	12	U	0.5	U	0.5	U
Ethylbenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
Hexachlorobutadiene	0.5	U	12	U	12	U	0.5	U	0.5	U
Isopropylbenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
Methylene chloride	0.5	U	12	U	12	U	0.5	U	0.5	U
n-Butylbenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
n-Propylbenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
Naphthalene	0.5	U	12	U	12	U	0.5	U	0.5	U
p-Isopropyltoluene	0.5	U	12	U	12	U	0.5	U	0.5	U
sec-Butylbenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
Styrene	0.5	U	12	U	12	U	0.5	U	0.5	U
tert-Butylbenzene	0.5	U	12	U	12	U	0.5	U	0.5	U
Tetrachloroethene	1.1		33		30		0.5	U	0.5	U
Toluene	0.5	U	12	U	12	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	0.5	U	12	U	12	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	0.5	U	12	U	12	U	0.5	U	0.5	U
Trichloroethene	0.22	J	90		86		0.5	U	0.5	U
Trichlorofluoromethane	0.5	U	12	U	12	U	0.5	U	0.5	U
Vinyl chloride	0.5	U	12	U	12	U	0.5	U	0.5	U
Xylenes (total)	0.5	U	12	U	12	U	0.5	U	0.5	U

APPENDIX F

MONITORING WELL/MICROWELL LABORATORY ANALYTICAL RESULTS

Appendix F. Summary of Groundwater Analytical Results - Additional Well Sampling and Resampling of Existing Wells
Operable Unit 4

Naval Training Center, Orlando
Orlando, FL

Sample ID	13G00102		13G00202		13G00302		13G00402		13G00402D		13G00502		13G00602		13G00702		13G00802		U4G01801		U4G01801D		U4G01901		U4G02001	
Sampling Date	24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97	
Volatile Organics, ug/L																										
1,1,1,2-Tetrachloroethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,1,1-Trichloroethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,1,2,2-Tetrachloroethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,1,2-Trichloroethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,1-Dichloroethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,1-Dichloroethene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,1-Dichloropropene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,2,3-Trichlorobenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,2,3-Trichloropropane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,2,4-Trichlorobenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,2,4-Trimethylbenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,2-Dibromo-3-chloropropane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,2-Dibromoethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,2-Dichlorobenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,2-Dichloroethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,2-Dichloropropane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,3,5-Trimethylbenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,3-Dichlorobenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,3-Dichloropropane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
1,4-Dichlorobenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
2,2-Dichloropropane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
2-Chlorotoluene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
4-Chlorotoluene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Benzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Bromobenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Bromochloromethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Bromodichloromethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Bromoform	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Bromomethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Carbon tetrachloride	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Chlorobenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Chlorodibromomethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Chloroethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Chloroform	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U

Appendix F. Summary of Groundwater Analytical Results - Additional Well Sampling and Resampling of Existing Wells
Operable Unit 4

Naval Training Center, Orlando
Orlando, FL

Sample ID	13G00102		13G00202		13G00302		13G00402		13G00402D		13G00502		13G00602		13G00702		13G00802		U4G01801		U4G01801D		U4G01901		U4G02001	
Sampling Date	24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97	
Chloromethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
cis-1,2-Dichloroethene	30		0.5	U	7.3		0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10		10	U	0.31	J	150	U
cis-1,3-Dichloropropene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Dibromomethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Dichlorodifluoromethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Ethylbenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Hexachlorobutadiene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Isopropylbenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Methylene chloride	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
n-Butylbenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
n-Propylbenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Naphthalene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
p-Isopropyltoluene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
sec-Butylbenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Styrene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
tert-Butylbenzene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Tetrachloroethene	46		14		9.3		0.13	J	0.5	U	1.5		0.5	U	28000		0.18	J	430		400		9.3		6900	
Toluene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
trans-1,2-Dichloroethene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
trans-1,3-Dichloropropene	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Trichloroethene	14		0.5	U	5.2		0.5	U	0.5	U	0.21	J	0.5	U	620	U	0.5	U	2.7	J	2	J	2.3		910	
Trichlorofluoromethane	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Vinyl chloride	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Xylenes (total)	1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	620	U	0.5	U	10	U	10	U	0.5	U	150	U
Inorganics, ug/L																										
Aluminum	48.8	B	560		22	B	219		224		1340		364		101	B	386		NA		NA		NA		NA	
Antimony	18	U	18	U	18	U	18	U	18	U	18	U	18	U	18	U	18	U	NA		NA		NA		NA	
Arsenic	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	NA		NA		NA		NA	
Barium	1.6	B	13	B	2.8	B	10.2	B	10.7	B	11.2	B	7.9	B	2.6	B	12.5	B	NA		NA		NA		NA	
Beryllium	0.2	U	0.25	B	0.2	U	0.24	B	0.28	B	0.21	B	0.2	U	0.2	U	0.2	U	NA		NA		NA		NA	
Cadmium	3.3	U	3.3	U	3.3	U	3.3	U	3.3	U	3.3	U	3.3	U	3.3	U	3.3	U	NA		NA		NA		NA	
Calcium	39400		3260	B	61700		3570	B	3660	B	33300		4240	B	45100		6550		NA		NA		NA		NA	
Chromium	2.4	U	2.4	U	2.4	U	2.4	U	2.4	U	2.9	B	2.4	U	2.4	U	2.4	U	NA		NA		NA		NA	
Cobalt	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	NA		NA		NA		NA	
Copper	1.4	U	2	B	1.4	U	1.4	U	1.4	U	3	B	1.4	U	2.1	B	1.5	B	NA		NA		NA		NA	

Appendix F. Summary of Groundwater Analytical Results - Additional Well Sampling and Resampling of Existing Wells
Operable Unit 4

Naval Training Center, Orlando
Orlando, FL

Sample ID	13G00102		13G00202		13G00302		13G00402		13G00402D		13G00502		13G00602		13G00702		13G00802		U4G01801		U4G01801D		U4G01901		U4G02001	
Sampling Date	24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		24-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97		25-Mar-97	
Iron	60.8	B	1310		10.2	B	918		935		72.8	B	375		35.4	B	199		NA		NA		NA		NA	
Lead	1.6	U	1.6	U	1.6	U	1.6	U	1.6	U	1.8	B	1.6	U	1.6	U	1.6	U	NA		NA		NA		NA	
Magnesium	958	B	3600	B	1240	B	2470	B	2520	B	1510	B	1910	B	3220	B	3760	B	NA		NA		NA		NA	
Manganese	0.8	U	3.6	B	0.8	U	1.9	B	4	B	0.94	B	3.3	B	1.4	B	5.6	B	NA		NA		NA		NA	
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	NA		NA		NA		NA	
Nickel	8.6	U	8.6	U	8.6	U	8.6	U	8.6	U	8.6	U	8.6	U	8.6	U	8.6	U	NA		NA		NA		NA	
Potassium	661	B	1790	B	299	U	3600	B	3800	B	610	B	597	B	5840		2920	B	NA		NA		NA		NA	
Selenium	3.7	B	3.4	B	3.7	B	3.1	B	2.9	B	2.5	U	2.5	U	3.9	B	3.4	B	NA		NA		NA		NA	
Silver	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	2.9	U	NA		NA		NA		NA	
Sodium	4100	B	13100		2620	B	12400		12800		2250	B	14000		17100		15900		NA		NA		NA		NA	
Thallium	3.7	U	3.9	B	4.8	B	3.7	U	4.6	B	6	B	4.8	B	6.1	B	3.7	U	NA		NA		NA		NA	
Vanadium	14.7	B	1.8	U	1.8	U	2.5	B	2.2	B	1.8	U	1.8	U	31.8	B	1.8	U	NA		NA		NA		NA	
Zinc	2.7	B*	12.8	B*	2.1	B*	2.4	B*	3.4	B*	17.2	B*	44.7	*	13.9	B*	22.6	*	NA		NA		NA		NA	